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THE LEGAL ASPECTS OF THE TRANSFER OF TECHNOLOGY FROM THE
DEVELOPED TO THE DEVELOPING COUNTRIES WITH SPECIAL REFERENCE
TO THE ALGERIAN EXPERIENCE

by

BOULARES HAMZA

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University of Warwick,
Coventry

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This thesis was submitted for examination on behalf of Boulares Hamza who died before the thesis could be examined for the degree of PhD. Under the University's Regulations, a degree cannot be conferred upon a deceased person. However, it was felt that the thesis ought to be examined and duly appointed examiners were asked to consider the thesis and to express a view as to whether it was equivalent in standard to a PhD thesis submitted in the normal way. The examiners were informed that in the light of their views a decision would be taken whether or not to lodge the thesis in the University Library. The decision of the examiners was that the work was equivalent in standard to that of a PhD and the thesis has therefore been lodged in the Library.

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PETER J MURRAY

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23/10/84.

ABBREVIATIONS

BIRPI	Bureaux Internationaux Renus pour la Protection de la Propriete Intellectuelle
BTU	British Thermal Unit
CAMEL	Companie Algerienne de Methane Lequide
CFP	Companie Francaise des Petrole
CPC	The Community Patent Convention
EEC	European Economic Community
EPC	European Patent Convention
FPC	Federal Power Commission
FTA	Foreign Technical Assistance
GDF	Gaz De France
ILM	International Legal Materials
INAPI	Institut Algeriene de Normalisation de Propriete Industrielle
IPC	International Patent Convention
LNG	Lequified Natural Gas
LDCs	Lesser Developed Countries
MNC	Multinational Corporation
NE	National Enterprise
NIEO	New International Economic Order
OAMPI	Office Africaine et Malgache de la Propriete Industrielle
OECD	Organization for Economic Cooperation and Development
PIP	Plant in Production
PTC	Patent Cooperation Treaty
RBP	Restrictive Business Practice
R&D	Research and Development
SNS	Societe Nationale de Siderurgie
SONATRACH	Societe Nationale de Transport et de Commercialisation des Hydrocarbures
TK	TurnKey
TOT	Transfer of Technology
UNCTAD	United Nations Conference on Trade and Development
VALHYD	Valorisation des Hydrocarbures
WIPO	World Intellectual Property Organisation

CONTENTS

Foreword
Abbreviations
Contents
List of Annexes
List of Tables

	<u>Page</u>
<u>INTRODUCTION</u>	1-17
PART ONE: CHAPTER ONE	18
<u>ECONOMIC EVALUATION OF PATENTS AND THEIR FUNCTION IN THE PROCESS OF TECHNOLOGY PRODUCTION WITHIN THE CAPITALIST FRAMEWORK</u>	
The Patent System in a Capitalist Framework	21
The Economic Theory of Patents	23
Patent Monopoly Versus Trade Secret Monopoly	31
Patents and the Production of Technology	36
(A) The Individual Inventor	37
(B) The Role of the State in R & D	39
National Patent Laws	46
(i) Examination Versus Registration	46
(ii) First to File Versus First to Invent	48
(iii) Compulsory Licensing	49
The International Patent System	52
1. National Treatment	55
2. Import Monopoly	56
3. The Priority Right	56
4. The Independence of Patents	57
A - International Agreements	58
1. The Convention for Establishing the World Intellectual Property Organisation	58
2. The Strasbourg Agreement Concerning the International Patent Classification	59
3. The Patent Cooperation Treaty (PCT)	60
The Main Advantages of the PCT	64

B - Regional Agreements	66
Notes to Chapter One	69-96
Annexes to Chapter One	97-101

CHAPTER TWO

<u>THE PATENT SYSTEM AND THE INTEREST OF THE</u> <u>DEVELOPING COUNTRIES</u>	102
1. Characteristics and Cost of the Patent System in its Present Form to the Developing Countries	106
A: Foreign Ownership of Patents as Compared to Local Ownership	107
B: Corporate Ownership of Patents	111
C: The Non Working of Patents	112
D: The Cost of the Patent System	115
2. The Changes in National Patent Laws and Their Impact	120
A: Patentability	121
B: The Scope of the Patentee's Privileges	122
C: The Working of Patents	125
The Impact of the Changes	128
1. Foreign Patenting	128
2. The Working of Patents	130
3. Grounds for the Revision of the Paris Convention	131
Notes to Chapter Two	141-163
Annexes to Chapter Two	164-170

CHAPTER THREE

<u>REGULATION OF THE TRANSFER OF TECHNOLOGY: AN</u> <u>EVALUATION OF THE NATIONAL LEGISLATIONS OF</u> <u>DEVELOPING COUNTRIES AND THE UNCTAD'S CODE OF</u> <u>CONDUCT</u>	171
1. National Regulations	174
Export Restrictions	186
2. Restrictions Affecting the Economy in General and the Technological Capability of the Recipient Countries	189

A: Restriction on R & D	189
B: Grant Back Provisions	191
C: Restriction on Competing Technology and Products	194
3. Restrictions Relating to Financial Aspects	198
A: Package Licensing	198
B: Duration of Transfer of Technology Agreement	199
C: Tie-In Restrictions	201
The UNCTAD'S Code of Conduct on the Transfer of Technology	202-217
Notes to Chapter Three	218-241
Annexes to Chapter Three	242-245

PART TWO: CHAPTER FOUR

<u>THE INDUSTRIAL AND TECHNOLOGICAL POLICY OF ALGERIA</u>	246
A - The Underdevelopment Status of Algeria	249
B - Algeria's Industrial Technological Policy	252
1. The Vicious Circle of Underdevelopment	253
2. The Industrializing Industries	256
The Consequences of the Policy	259
Notes to Chapter Four	262-272

CHAPTER FIVE

<u>THE LEGAL ASPECTS OF TECHNOLOGY ACQUISITION: THE ALGERIAN EXPERIENCE</u>	273
A - Projects Evolution and Contractual Procedures	273
B - The Contractual Aspects of the Algerian Experience in the Field of Technology Transfer	283
1. Separate Contracts	284
2. Turnkey Contracts	290
3. Plant in Production Contracts	300
First: The Initial Management Element	305
Second: Manpower Training	307
(A) Internal Training	309
(B) External Training	310
Third: The Guarantee of the Result	312
(1) The Delay in the Realization of Industrial Units	313

(2) The Quantity and Quality Elements	314
(3) The Rate of Integration	315
Fourth: The Acquisition of Technology	317
Negative Aspects of Plant in Production Contracts	320
(4) Mixte Enterprises	333
Summary and Suggestions	342-250
Notes to Chapter Five	351-373
Annexes to Chapter Five	374-395

CHAPTER SIX

<u>A CASE STUDY OF THE ALGERIAL GAS INDUSTRY</u>	386
Background to the Gas Liquefaction Industry	386
First: Liquefaction Plants	390
(A) The CAMEL PLANT (GL4Z)	391
(B) LNG SIKDA	392
(C) The Cancellation of the VALHYD PLAN and the Disadvantages of the Plan	396
Second: Gas Transportation	404
(1) Hassi R'mel - Sicily Transmed Pipelines	404
(2) Arzew (Algeria) - Alicante (Spain) Pipeline	407
SONATRACH - EL PASO Contract LNG1:	408
- Political and Economical Background and the Attitude of the French Oil Companies	
- Price Negotiations	
Technical Assistance	427
1. Concentration of Planning and Execution of Industrial Development	428
2. The Lack of National Policy for the Consumption of Foreign Technical Assistance	429
3. Types of Foreign Technical Assistance	431
1. Integrated Technical Assistance	431
2. Specified Technical Assistance	432
3. Autonomous Technical Assistance	433
Concluding Remarks	435-443
Notes to Chapter Six	444-468
Annexes to Chapter Six	469-478

CONCLUSION

BIBLIOGRAPHY

LIST OF ANNEXES

PAGE

PART ONE: CHAPTER ONE

Annex 1:1.	The influence of patent protection according to the company size in the Federal Republic of Germany	97
1:2.	Time between discover and economic use according to company's size	97
1:3.	Patenting and non-patenting in conjunction with the size of firms in three United Kingdom Industries	98
1:4.	Distribution of public funding by objective in five OECD countries	99
1:5		100-101

CHAPTER TWO

Annex 2:1	Proportion of patent ownership by non-residents in selected developing and developed countries	164
2:2	Annual Evolution of foreign patenting in Algeria (1966-1978)	165
2:3	Patent application filed in selected reporting countries (1969-1978)	166
2:4	Restrictive Business practices included in licensing agreements in India and The Phillippines	167
2:5	Distribution of assets by transfer's type in selected countries (Algeria, India, Latin America, Phillippines and industrialized countries)	168
2:6	Patent application filed in Mexico, India Colombia, Argentina as compared with other developing countries 1969 and 1979	169
2:7	Foreign direct investment stock in Argentina, Columbia, Mexico and India.	170

CHAPTER THREE

Annex 3:1	Institutional machinery for the application of the transfer of technology systems in Latin America	242-243
3:2	Actual Personnel in charge of contracts Evaluation in Latin America (1979)	244
3:3	Registration and review of direct foreign investment and technology contracts in Venezuela (As of Dec. 1974)	245
3:4	Registration and review of technology contracts in Colombia (1973-1975)	245

CHAPTER FIVE

Annex 5:1	National enterprises under three ministries for industries	374
5:2	The import monopoly enterprises in the industrial sector in Algeria	375
5:3	Different separate contracts passed between the SNS and foreign firms for the realization of El-Hadjar Steel and Iron Complex	376-377
5:4	Turnkey contracts in the Algerian Petrochemical Industry	378
5:5	Contracts awarded to DIAG in the mechanical industry	378
5:6	Global cost of contracts for technology acquisition 1973-1978	379
5:7	Sonatrach's subsidiaries and associated companies	380
5:8	The evolution of contractual forms in the importation of technology to Algeria 1967-1976	381
5:9	Industrial projects realized and being realized at the end of 1979	382
5:10	Role and responsibility of partners under the different contractual forms in the case of Algeria	383

5:11 Geographical Origin of Technology imports by Algeria: The seven leading countries 1970-1975	384
5:12 Share of countries in the realization of investment in the light industries 1974- 1977	385

CHAPTER SIX

Annex 6:1 Algeria's Gas Liquefaction plants up to December 31, 1982	469
6:2 SONATRACH: LNG and Natural Gas export contracts	470
6:3 Actual and Future employment in the gas liquefaction plants	471
6:4 Investment programs by sector 1970-1984	472-473
6:5 Inflow and Outflow of cash in Algeria: VALHYD PLAN (April 1978)	474
6:6 The cost of pure and tied foreign technical assistance in Algeria between 1973-1978	475
6:7 Contracts for the establishment of the Algerian gas industry (1967-1977)	476-478

LIST OF TABLES

PAGE

CHAPTER FIVE

Table 5:1	The Algerian Economy Requirements for Manpower 1970-1977	308
5:2	Cost for the Realization of the ENGINES AND TRACTORS complex at Constantine	311
5:3	Estimated cost of an Identical Complex to the ENGINE AND TRACTORS complex at Constantine	327

INTRODUCTION

Ever since the United Nations' Declaration of 1974 concerning the New International Economic Order "NIED", the question of the transfer of technology has become the centre of an extensive debate and considerable controversy. Both the debate and the controversy are the result of a complex set of separate but closely linked issues. Principally, these issues include the present unequal distribution of wealth, industrial activities and scientific and technological knowledge throughout the international community. Such inequalities are no more apparent than between the economies of the privileged and developed North, and the underprivileged and developing South. While the countries of the North, which represent only one third of the human race, are today occupied with the standards and qualities of life, the other two thirds are fighting for their survival in which they are confronted by the domination of the former.

The inequality in the distribution of wealth and technical means is made even worse by the prevailing inequality in trade transactions between partners of different technological levels and states on unequal footing with one another. In general, they are intermittent relations in which it is customary to exploit to the utmost the superior strength and the dominant position which such strength procures.

When the formerly colonized nations acceded to political independence, they became confronted by an international law without their consent or participation. Such law had ignored their aspirations and sometimes was even in complete contradiction with their interests.

The international law which had allowed their subjugation and exploitation had to be met with suspicion if not hostility from the newly independent nations. Thus, the first consequence of decolonization was the questioning of the very foundations of that law. This questioning process was characterized first of all by an intensive and legitimate distrust of the former colonial powers. Then it took a more precise form as the developing countries became more aware of their rights and obligations, and more familiar with international relations and mechanisms.

By becoming aware of their own problems and by proposing solutions in line with their own vision of the world, the developing countries know that to some extent they are opposing the interests of the industrialized nations. However, their action is not aimed at correcting injustice by creating another one, nor that their vision is of an utopian world that would banish the inequalities of power and wealth. They recognise that these inequalities will persist inspite of all the efforts aimed at mitigating them. But equally, the developing countries have concluded that the present international law must be revised in its principles, priorities and structure.

Moreover, the rationality and the balance of international law are continually tested by the progress of science and technology. With such progress, the technological gap between developed and developing nations widens, and so does the economic disparity between them. For example, the development of deep sea mining technology and the discovery of new mineral resources not only decreases the developed nations' dependence on raw materials, but severely affects the economies of many developing countries whose livelihood depend on the

export of such raw materials. It goes without saying that the new technology is being developed within - and for a long time will be - the exclusive monopoly of the developed countries. Against this background, the developing countries continue to depend on the developed countries for the technology necessary to carry out their developmental projects.

Due to the increased awareness and realization among the developing countries of the social, economic and political impact which science and technology could have on their development programmes, they began to press harder the scientific and technological inequality. The immediate effect of this awareness has been to put in the forefront of the international debate - or at least among the most important issues - the problem of science and technology acquisition. The developing countries captivated by the technological factor have begun the process of hiring such technology on a massive scale from a vast pool of industrial technology accumulated in the industrialized nations (capitalist and socialist). The large scale operation is due to the significant technological delay which has been accumulated by the developing countries and the lack of viable indigenous technology base from which these countries can initiate and sustain the desired tempo of industrialization. However, as technology transactions take place largely in a highly imperfect world market, there are serious obstacles to the access and the acquisition of foreign technology. For the transfer of technology to have a chance of equity there must first exist a technology market for supply and demand which would allow for the appreciation, comparison and exchange of information on the value of the sought technologies. Such a market rarely exists at the present time.

Technology is generally but not exclusively, transferred under licensing agreements. A license agreement often consists of protected property rights, as it may be in the form of rights created and protected by contracts and dealing with technical information and know-how. It is also common to transfer technology with an implied license. It might be incorporated in machineries or equipment which are essential for the manufacturing of products from the codified technology. A common form for combining licenses, machineries and other services is the method of Turnkey plants. The countries with more developed industrial structure tend to opt for licensing agreements, while countries at their early stage of industrialization tend to rely more heavily on transfer mechanisms such as direct foreign investment and turnkey plants.

Technology contracts are not easily classified into a distinct number of categories. Very often they are complex and involve features found in more than one of the classifications identified in chapters two and five. These classifications are namely: licensing agreements, service contracts - [i.e. training, consultancy, management and technical assistance contracts] - , turnkey and plant in production "produit en main" contracts and joint venture arrangements. The novelty in the field of contractual relations meant that technology contracts can vary significantly from contract to contract in terms of what might be embodied in them, and in terms of the rights and the obligation of the contracting parties. The highly diversified contractual practices comprised in national legislations and the UNCTAD's Code of Conduct on technology transfer are in fact a manifestation of the laissez-faire approach which has prevailed in the area of contractual freedom.

Originally, technology contracts consisted mainly of industrial property, but now have assumed a more complex and differential forms, the more recent of which being the plant-in-production method of contractual relations. Therefore, the scope of technology contracts have expanded to include a variety of services. The expansion is essentially the result of two factors: the need to meet the requirements of many developing countries who cannot otherwise work licenses without additional services, and the packaging of technology contracts by licensors and suppliers. It follows, that the scope of technology contracts can be used on one hand to indicate the strong or weak bargaining power of the recipient enterprise, and on the other hand to show the extent of that enterprise technological dependency in a particular field of technology. In other terms, the wider the scope of a contract, the weaker the bargaining position of the recipient enterprise has been during the negotiations, or the more technologically dependent the recipient is.

Basically, a technology contract in one form or another embraces elements of at least one of the following: (a) the right to exploit or use industrial property i.e. patents, know-how, utility models and trademarks, (b) the means to do i.e. direct foreign investment, equipment and machinery; and (c) the ability to do such as training and direct intervention of foreign experts.

The basic purpose of this study is to analyse the function of the patent system not only in the developing countries but also in the developed countries, and to assess what impact the system might have on the national economies of the former and on the generation of

technological knowledge in the latter. Equally, it illustrates that the central issue in the acquisition of technology by the developing countries is not the patent system itself, but rather the local technical ability - or the lack of it - to put things together, to make them work, to maintain efficient operations and to put the patented technology into useful products.

To achieve these objectives, it was necessary for me to divide this study into two parts, each comprising of three chapters. The first part is confined to the preacquisition of technology, in which I shall describe the significance of the patent system in relation to the generation of technical progress; or in more specific terms the economic justification of patent protection within the capitalist framework. Then, I shall go onto describe the current national and international efforts aimed at redefining the role of the patent system to meet the problems of technology acquisition by the developing countries.

Furthermore, it is my objective to examine some of the newly introduced national and regional legislations regulating the inflow of foreign technology, especially those of the Andean Pact, and finally to assess the work of the United Nations Conference on Trade and Development "UNCTAD" in this field.

Since the acquisition of technology calls for a high level of knowledge and efficiency, a great many legal barriers have been put around it. Those legal barriers of which the patent system is one, are very effective when applied to the developing countries. Advances in

technology are protected in such a way that it is virtually impossible for a developing country to obtain them. To obtain the knowledge and equipments which the developing countries believe are essential to their progress, they became supplicants before the high priests of technology namely the multinational corporations.

The patent system is being advanced by the technology producing countries as an indispensable channel for passing technical knowledge and as the means for disseminating inventions and an instrument of international cooperation in the field of science and technology. We are told that the purpose of the patent system is the remuneration of inventors whose genius led to the progress being made in the first place. However, the function of the patent monopoly is not so much to reward inventors since it has become another way of rewarding capital. Furthermore, the patent grant is supposed to encourage inventors to disclose their inventions by means of patent specifications, so that it can stimulate further technical progress and finally to make the invention available to the public either through use of after the expiry of the patent life.

However, patent specifications which may be sufficiently clear to an experienced manufacturer in the industrialized countries, are of no practical use to a company in a developing country who has to spend yet more money and sign more contracts in order to obtain the necessary know-how. Patent specifications are rarely sufficient to allow for the production of the patented product, which is precisely what the patent

holders intended it to achieve. It is in this way that firms which develop inventions, contrive to protect themselves illicitly from the compulsory licensing systems adopted by many countries, by means of misleading patent descriptions and withholding vital details. In return for a substantial payment, rarely less than few hundred thousand dollars, the licensee gets no more than a brochure containing few instructions wherein the secret, instead of becoming entitled to use the patented technology. Under such circumstances the cost of licenses correspond at most to the right to understand, but not to use. The result of this is the proliferation of contracts and more expenditure without matching returns for the licensee and opportunities for the licensor to make money without giving anything away.

When one talks about patent protection one has to bear in mind that not all the scientific and technical knowledge is subject to patent protection. On the contrary, technology ranges from simple and traditional to sophisticated and fast changing. Overall, only a small portion is protected and even a smaller portion is secret, but most is in fact in the public stock of knowledge in the form of published information. However it required knowledge of their availability and a level of competence and sophistication to even select and make use of such information. Apart from the lack of information, the developing countries cannot, as a rule, put to adequate use the technological information which has been disclosed by means of world wide patent protection. Therefore, while it is true that the knowledge contained in patent documents falls in the public domain, this is only a purely theoretical proposition as far as the developing countries are concerned.

Today we often hear of the patent system being denounced as a major obstacle to technology acquisition, especially from the developed to developing countries: we also hear that such a system should be substituted by a more just system under which scientific and technological knowledge are treated as a common heritage for all mankind, and that its transfer should not be subjected to any restriction. Economists from developing countries have come to the conclusion that the patent system does not contribute to technical progress in the developing countries and that it hinders it in certain cases. Accordingly, it would be more appropriate to abolish the system altogether.

In my view, it has yet to be proven in a more decisive manner that the abolition of the patent system would necessarily contribute to local technical progress, nor that it would facilitate local manufacturing of products which have been so far imported. To make the abolition acceptable, not only to the developing countries themselves, but above all to the technology producing countries, it is required to have convincing evidence against patents. It is also required to show that the social cost outweighed the social benefits, and to demonstrate that it had negative effect or no effect on the generation of knowledge. Thus, the abolition of the patent system on present evidence may be a false solution to a real problem.

Some 50 developing countries are members of the Paris Convention and none has yet to experiment the abolition of the patent system. On the contrary, there has been extensive legislative in the field of patents in the last two decades. Whether the enactment of new patents by the developing countries is due to a basic confidence that the

patent protection can also fulfill its role of promoting their technical and economical progress, or due to the fear of the unknown consequences, it is not clear. The one thing that is apparently clear from the new legislation is that the alteration of the system - to make the patent law more strictly subordinated to their development objectives - rather than the abolition may be the limit of the practical.

The criticism of the patent system is as old as the system itself. However in the last decade or so there has been persistent criticism from the developing countries. In some cases, the scope of patent protection has been substantially reduced by the newly introduced patent laws (Chapter Two). In particular the new legislation is designed to achieve the following: (1) To subordinate the individual right of the patent holder to the public interest. Or, to weaken the notion of patents as a private property in favour of a public policy. (2) As a result of the shift from private notion to public policy, the scope of patent protection was limited to specifically exclude the right to import. Such measure is intended to exclude patents from being used as an import monopoly by the holder and to allow the granting country to import identical products at a cheaper price from other competitors in disregard or non-observance of patents (i.e. pharmaceutical products).

(3) To ensure that the technology which is important to development can be imported without the obstacle of private monopoly, general and specific restrictions on patentability were introduced. Specific restrictions first and foremost affect chemicals especially pharmaceutical inventions, while general restrictions exclude the granting of patents for inventions affecting the developing of the concerned country.

(4) Furthermore, to ensure that the patented technology becomes available to the general public as soon as possible, the duration of the patent protection was drastically reduced to seven and five years in India and Peru respectively.

Finally, these reforms and others will not be sufficient unless the international patent protection is also reformed. The Paris Convention for the protection of Industrial Property of 1884, is no more than a cartel serving the interest of the technology producing nations. The Convention was initially based on the assumption that the member states are economically of an approximately equal standing. However, the accession of many developing countries to the Convention meant that such supposition can no longer be upheld. Accordingly, appropriate amendments to the Convention ought to include preferential treatment in favour of the developing countries.

The transfer of technology can be made to serve the national objectives of the recipient developing country provided that additional and appropriate measures are adopted at both national and international levels. One manifestation of such measures has been the initiation by some of the Latin American countries of regimes of control of the importation of foreign technology. These regimes are designed to allow the state to exercise the control and the direction in the use of foreign technology. They also aim at obtaining the transfer on as favourable conditions as possibly by strengthening the negotiating position of national companies. Under these regimes, technology contracts must be submitted to national competent authorities for approval and registration, otherwise those contracts will have no legal force, in particular the licensor may not claim royalty payments.

Another manifestation of national policy measures could be to make a concentrated effort towards progressive and parallel building of local technological capabilities in terms of indigenous skill and R & D. The more a country acquire technological capital, the less the patent system becomes a problem for that country. Compulsory licensing will become more effective, information contained in patent documents becomes valuable and bargaining position will be enhanced.

In my view, the two policy measures are interdependent and should be dealt with concurrently. To do otherwise would only lead to disastrous results as the Algerian experience indicates. In fact, the whole process of the transfer of technology is so closely interwoven with the socio-politico-economic prerequisites of development, that policy and organisation for its execution cannot be viewed in isolation, but on the contrary ought to be coherently coordinated with the national policies on science and economic planning. This is studied in the second part of this study as summarised below.

To overcome historical dependence and stagnation Algeria needs to master the technology which is mostly imported from the Western industrialized countries. Thus, I shall start with a very brief description of Algeria's main industrial and technological policy (Chapter Four). The strong emphasis is on economic independence which is regarded as the basic factor for a highly integrated and dynamic economic structure.

Basically, the industrial and technological policy of Algeria is based on breaking the vicious circle of underdevelopment (i.e. small

market, return on capital and trained manpower) and on establishing what became known as the industrializing industries (the establishment of key manufacturing industries). The Algerian planners also believe that progress does not only mean the importation of foreign technology, but equally its assimilation. What the Algerians were seeking was not the mere purchase of the means of production, but rather to be taught how to produce those means. In this context, the transfer of technology is considered to be possible only when a country joins the industrial process. Both the industrial process and the acquisition of machinery and equipments will have the effect of allowing Algeria to acquire technological capital.

Perhaps the most important issue of Algeria's technological policy are the innovations in the field of contractual relations with the suppliers of technology. The innovation concerns the introduction of a new contractual method called "plant in production" (*produit en main*). Under this form of contracts, the contracting foreign company is required to provide the following services to the client national enterprise:-

- (a) the delivery of an industrial plant in the form of a turnkey;
- (b) the guarantee to train Algerian personnel both abroad and in Algeria;
- (c) to provide technical assistance for the functioning of the constructed plant and to guarantee its initial management up to the cruising stage.
- (d) to guarantee production both in terms of quality and quantity corresponding to a fixed calendar in the contract; and

(e) finally, to communicate to the client national enterprise licenses and documents of fabrication, the know how and show-how in order that the contract results in a transfer of technology.

The plant in production method has been developed by Algeria as a result of the failure of turnkey contracts. Unlike turnkey contracts, the contracting foreign firm under the plant in production "PIP" is not systematically absolved from responsibility at a specific date following the putting into service of the installations, but at times and conditions which are not negotiable under turnkey. For example, the foreign contracting party may be absolved from responsibility after the installations has been operating for a lengthy period of time with the national enterprise own personnel whom the supplier is responsible for training.

The PIP method aims at ensuring - at least theoretically - the total collaboration of the contracting foreign parties. It combines licensing agreements, technical assistance, engineering, purchase of equipment and machinery, erection of installations and training of operational and managerial manpower in a single contract. This unquestionably provides a greater protection for the client enterprise, who instead of having a multitude of partners taking advantage of its incompetence deals with only one partner who is responsible for everything. In other terms, it is easy to pinpoint the areas in which there is deviation from the contractual specifications for which the supplier can be held responsible since his responsibility is global. The global responsibility is also an element of turnkey contracts, but does not cover the overall handling of installation, training and organization.

It is true that the global responsibility makes the plant in production a more packaged form of technology transfer, but in my opinion, there are reasons to believe that it is an ideal method for countries who lack technological capital or lack industrial experience.

Since contractual relations constitute a major problem in the transfer of technology, a particular attention will be given to the different contractual forms binding national enterprises and their foreign partners. The gaps between formal contracts and the effective application of their provisions indicates the weak governmental monitoring of these relations and the absence of a coherent policy in the field of technology acquisition. No effective performance guarantee appeared to exist, although the need for performance was often advanced as an argument for minimizing the use of national inputs. If the contracting foreign company did not attain the performance within the stipulated time, the firm could be penalized for the delay, but never on account of the income foregone in the loss of production or commercialization. If we take the ultimate purpose of the contract from the recipient national enterprise's point of view into consideration, the direct prejudice suffered by that enterprise is not the same as that suffered by a company in the industrialized countries. If we evaluate the direct prejudice as the value of what the client expected to get under the term of the contract and which he did not get because of malpractices on the part of the supplier, then it is clear that the direct prejudice has no absolute value.

In the industrialized countries, companies tend to view that the caused prejudice must be confined to the loss of cash flow which would have resulted had the delay not occurred. However, in the case of

Algeria or any other developing country, the loss to the recipient company should be corresponding not only to the loss of cash flow but also operating costs, and expenses which the national enterprise has to meet without receiving any counterpart for them.

Throughout the execution of the contract, the recipient national enterprise does not benefit from the entitlement of the contract provisions, because it lacks the mastery of the technology, it cannot exercise its legitimate and often contractual right while work is in progress. It is not able to carry out the necessary controls and insists on the foreign partner taking steps to rectify any errors should the need arise. Therefore, the national enterprises play an altogether passive role throughout the duration of contracts. Furthermore, there is a striking contrast between the precision with which the risks assumed by the technology supplier are defined and the vague character of provisions regarding his contractual responsibilities.

The analysis of these and other aspects of contractual relations between the national enterprises and foreign firms is essentially intended to show that, on one hand, the present contractual relations between unequal partners accentuates inequalities between the contracting parties instead of reducing them. This constitutes an additional source of domination. On the other hand, the transfer of technology and all its associated problems do not for many developing countries end once contracts or licenses have been signed, even if the terms of the transfer were favourable to the recipient. On the contrary, the problems for the recipient have just begun. It is an

analysis of what happens to the technology once it is imported, and how the actual transfer takes place. These aspects tend to be ignored in most discussions and writings on the transfer of technology.

Finally, the problem with Algeria's industrialization process is not of course limited to contractual relations, but also to whether the emphasis on the competitiveness of products with those of the industrialized countries would not make the building up of technological capability through the importation of technology a practical impossibility while it is theoretically possible.

CHAPTER ONE

ECONOMIC EVALUATION OF PATENTS AND THEIR FUNCTION IN THE
PROCESS OF TECHNOLOGY PRODUCTION WITHIN THE CAPITALIST FRAMEWORK

Any discussion of the transfer of technology "TOT" quickly brings to the mind the controversy over the patent system as a legal device designed to encourage industrial creative activities, through the grant of a temporary monopoly. Also, it brings to attention the widespread confusion over the true values of patents in the context of technology transfer to developing countries. The significance of patents in the present debate stems from the fact that inventions are legally protected for a defined period. In principle, the passing of those inventions to developing countries cannot be ceded without financial return, in the form of royalty payments, or a lump-sum, or both, to the patent holder. However, patented technology is only the visible part of the process of technology transfer since, more often than not, additional know-how is required. For a patented invention to be exploited in the majority of developing countries, equipments and direct intervention of foreign personnel may also be a precondition. This is mainly due to the low level of domestic technological capacity which cannot absorb the imported technologies on its own effort.

Within the last few years, two opposing approaches concerning the legal issues of technology transfer have become apparent. The first approach is advocated by the technology producers of the

industrialised countries of the West, claiming that the legal protection of industrial property rights, in the form of an exclusive use for a definite period of inventions by investors, must remain and that licensing agreements should only be restrained when they conflict with anti-monopolies laws (i.e. when they restrain competition).

The second approach represents the views of the developing countries, which challenges traditional ideas and seeks to gain easier access to technology. Developing countries argue that industrial property protection and the sanctity of contracts must be balanced with the economic and social needs of the society which it serves. Such balance can be facilitated by the recognition of their inherent right to preferential treatment, and that governments of the industrialised countries should use their power to compel their private enterprises to grant such terms[1].

Due to the widely shared economic concept among the Western economies, the legal rules appear to create little problems. In contrast, the legal framework within the developing countries is considered as insufficient, and as a result of which, countries have began to take unilateral national action rather than to rely on international cooperation. Undoubtedly, most economists would agree that there is a very real need for developing countries to acquire technology. Most of the technology is in the hands of private companies of the West. Thus any national regulation of its transfer must find a balance in which the concerns of the recipient countries

are recognised, but equally does not discourage the foreign suppliers.

The legal issues raised by the international transfer of technology can only emerge from the consideration of a wider process within which the narrow technical issues of the transfer are located. On one hand, the present systems governing the production of technology and its diffusion are the intended outcome of few decisions taken by the industrial power nations. In other terms, those decisions taken by the industrial power nations were intended to establish principles and standards at the national level, and were later adopted as major elements and regulations of existing international standards. The development of those principles and standards was designed to provide increasing protection to the technology's owner and those who produce it. On the other hand, the development of the legal process, at national and international levels, was a response to the needs of politically and economically social strata[2].

The basic purpose of this chapter is to trace the sources of technology production, within the framework of the first approach advocated by the industrial countries. Such production continues to be the main reason for enacting patent legislations. Only then we might be able to appreciate and discuss the relevance of patents in the process of the transfer of technology to developing countries.

THE PATENT SYSTEM IN A CAPITALIST FRAMEWORK

A patent may be defined as a legally binding monopoly awarded by governments to inventors to exclude others from manufacturing, selling, or using the patented invention, without the patentee's consent for a defined period of time. In return inventions become freely available to the public after the expiration of the patent life[3]. This legalised monopoly right can be looked at as a kind of bargain between the state and the inventor, in which the invention may assist the generation of industrial knowledge by becoming a part of the public stock of knowledge. To the inventor, the grant of a patent monopoly expresses the moral right of inventors to their knowledge and financial rewards to be obtained from the exclusive exploitation of the patented invention. In return for the prompt disclosure of new inventions the state grants a limited exclusionary right to inventors. Limited monopoly in return for disclosure, therefore is being seen in the industrialised countries as to provide the basic incentive for continued industrial progress.

One of the major components of the process of technological changes is the creation of new ideas and their first introduction to practice. We are told by economists that in a framework of a capitalist economies, private enterprise demand a constant flow of technological innovation. Further, such demand principally leads to the rely on patent protection - patent for inventions in return for substantial technological innovation -, thus, the temporary monopoly rises out of an economic necessity.

The rationality of patents stems from the characteristics of the marketability of invention, which neither depend on demand and supply, nor its acquisition diminishes the stock of knowledge. It is also accepted that the cost of reproducing information is less than that of its production. Therefore, it can not be revealed to the buyer to allow him to assess its merits and values, nor it can be sold in parts, since information is indivisible. If an invention was disclosed, the inventor would lose the property as it cannot be retrieved. To avoid a negative impact on the generation of knowledge, the assumption that knowledge is expensive to produce, cheaper to copy, was not adopted, for no further knowledge would be forthcoming if it was applied. Such fear takes into account the zero cost of transferring knowledge[4].

The patent monopoly is thus created to prevent "free riding" and to provide a better balance between the cost of transferring knowledge and the generation of new knowledge, which is necessary for the progress of society, so that private useful source "new inventions" can be employed and remunerated. In this sense, the apparent function of patents is to allow for the marketability of knowledge as a product, determined by the distribution cost rather than the production cost.

The aim of patent laws in the present capitalist framework is not so much to reward inventors, but rather to encourage innovators to risk capital and time in developing inventions and marketing them as products or services[5]. In fact, the inventors reward takes a

second place to that of innovators, for there is unlikely to be a reward for the former if the latter do not exploit inventions[6]. Thus, the grant of a patent monopoly to inventors is a means for creating a favourable climate for investors to invest in innovation.

THE ECONOMIC THEORY OF PATENTS

The economic logic behind the patent system appears to be based on the production of new technological knowledge. If such knowledge was made freely available as soon as it was discovered, it is feared that the free availability would destroy the incentive to take risks in conducting research in order to obtain inventions. Thus, if no means were available to those who produce information, there may not be new inventions. In this context, patent laws can be seen as deliberately designed by the state to support monopoly at the expense of competition, on the grounds that the community as a whole would in the end benefit from adding new knowledge to the already existing body of knowledge.

The patent system seems to help the individual inventor to benefit from his ingenuity, since it allows him to sell or license the invention, as he may not be able, under the present characteristics of the market, to exploit the invention himself. If no patent protection was available, the inventor would be forced to undertake the production and marketing of his invention. Whether the undertaking of production and marketing would enable him to benefit

from his invention is open to doubt, especially if the invention was of significant importance. There is a high possibility that large firms will attempt to produce it. In such situations, the inventor's investment may be jeopardised since the invention may be difficult to keep as a trade secret. Thus, the patent protection is seen as the only form which protects investment in ideas. It might also help the individual inventor who may choose to undertake the production of his invention to get financial assistance, as the patent constitutes a tangible and precise claim to an invention.

The role which the patent system had played in inducing new technical changes in the now industrialised nations was recognised by President Johnson in his proposed "Patent reform Act of 1967" to the U.S. Congress. He observed:

"The patent system has played an indispensable role in stimulating the nation's progress and prosperity. It has spurred the creative work of inventors and scientists. It has fastered the most far reaching technological advances in the history of civilisation. It has helped American business to translate the fire of genuine into the products and the processes that have enriched the lives of all of us"[7].

However, the past achievements of patents, as an incentive to new technological changes, may not justify the continuation of the system if one takes the view that it was originally designed to reward

individual inventors[8]. This is mainly because of the lack of available facilities to individual inventors to put their inventions into commercial forms and because of litigations cost.

In the end, the patented invention will be sold on a lump sum rather than on a royalty basis to a corporation which holds most patents in a specific field of technology, and which can practically dictate the purchase price of the inventor's patent. However, if one looks at the patent system as a public policy, designed to reward innovators, the system then may have some justification.

Professor J. B. Clark reviewed the patent system as a desirable stimulus to inventions. He held the view that, little inventing activity and very little of adopting of inventions by producers would occur without the patent system. He advanced the following proposition to justify the system:

"If the patented article is something which the society without a patent system would not have secured at all, the inventor's monopoly hurts nobody ... his gains consist of something which no one loses"[9].

Such proposition cannot withstand the realities of the present time, where the absence of patents is unlikely to prevent competitors from seeking to improve their position in the market through the introduction of new technical advances.

Annex 1:1 shows how the availability and non-availability of patent protection is likely to effect the introduction of new inventions in relation to the size of companies. The sample consists of 1200 patents examined in the Federal Republic of Germany[10].

The sample indicates that the size of companies plays a significant role in deciding whether or not to commit resources to research and development "R & D". In the small and medium sized companies only 3% and 8% of inventions respectively are claimed to have been patent-dependent discoveries, and would have not been undertaken without the patent protection. In other terms, 97%, 92%, and 90% of all discoveries by companies with less than \$250 million annual volume, are non-patent dependent and would have occurred without the patent protection. The situation is completely different with regards to larger firms with more than \$250 million; 53% of the discoveries are patent dependent. The high percentage may suggest that large companies tend not to commit resources to R & D efforts unless it can be justified in terms of expected future profits.

The overall propositions which Annex 1:1 suggests are: (i) There are two types of inventions, those which are patent dependent and those which are not. The value of the patent system in the capitalist framework would be great if it can only cover the patent-dependent inventions, and (ii) Industrial Knowledge in the form of new invention, contrary to what Professor Clark have suggested, would continue to occur. The occurrence may be at a lesser rate, especially with regards to larger companies, if the legal protection

was to be abolished[11].

The same IFO study showed the connection between patents and the size of companies, when the question of time between discoveries and their first economic use was considered. Annex 1:2 indicates that up to 40% of patents taken out by small firms had economic use in the first year, and up to 87% in four years. When this percentage is compared to the 15% and 50% for the first and four years respectively of patents taken out by large firms, it means that the larger the company becomes, the longer it takes to put its patents into an economic use.

When Annexes 1:1 and 1:2 are combined, they seem to suggest, that small companies in West Germany, although they take out patents and quickly convert them to economic use, prepared to innovate without patent protection. On the other hand, large companies are unlikely to invest in R & D projects, especially risky ones, without the patent protection. However, when large companies invest, they tend to take longer period of time to convert the discoveries to economic use. It is possible that large firms are mostly concerned with complex technologies, the development of which take a longer period of time. However, this trend may also be interpreted as a deliberate policy, by large companies to exclude the entry of competitors from a particular field of technology.

In order to block the entry of competitors in a particular technological field, large companies may acquire a substantial

proportion of patents, either through R & D effort or the acquisition of companies. In such cases the result is likely to be a suppression of technological advances in that particular field, since competitors will find it difficult to innovate around the dominant company's technologies. The company's position is thus protected by the number of patents it holds, instead of its innovative quality. When the dominant position is the result of patent holding, technological progress in the field in which that company operates becomes solely dependent on the progress that such a firm may make.

To this end, the patent system appears to have run into contradiction within the capitalist framework. Instead of being a source of continuous flow of technological improvements, it has become a source of blocking such flow.

The decline of the role of patents in spreading technological knowledge has much to do with the shift of patents ownership from individual inventors to business firms. The present inventor is more likely to be an employee, who has possibly agreed to assign his invention in advance to his employer as a condition of employment. Or he might be a member of an organized research group employed to invent in competition with other organized groups so as to get into the market first. Such shift also has the effect of transforming a temporary monopoly to an unlimited period through the use of improvements which take the place of the expired patent grant.

The shift in the ownership of patents may in fact facilitate

patent abuse by large companies, and thus tends to indicate that the existin patent laws favour large companies and allows to maximise their profit. The following example, cited by Khan, shows how large companies use patents to dominate an industrial field:

"... Patent applications are being made as to prevent the use of improvement of any existing or possible substitute of the bottle-making machine. This ... seek to block competing devices which would lessen our income ... We now have a number of applications which were filed to definitely forestall the development of competing machines by others"[12].

Therefore, the function of patents appear to act as means facilitating the dominance of companies in industrial fields. Once such dominance is achieved, a company "creates the very conditions for its perpetual control"[13]. Even when competitors succeed in taking patents in the same field as the dominant company, the exploitation of such patents may not take place due to the fear of litigation cost. The cost of litigation may also lead small companies and individual inventors not to take action when their patents are infringed by large companies since the cost of litigation is likely to be outside the means of small firms let alone individual inventors. Equally, such cost may be a deciding factor in the first place for not innovating in the field of the dominant company.

If an invention is not developed, because it lacks merit the

public may not lose much. However, when the non-use is deliberately intended to scare other inventors from a particular field of technology since the patented invention is neither invalid nor unworkable, the public interest is greatly affected. The public loss consists of the slowing down of the innovative process, which is legalised by the grant of patent monopoly.

The strong connection between patents and large companies is further indicated by Scherer who suggested that the number of patents taken out by firms increases with the size of firms[14]. However, the number of patents may also be an indication of increasing innovative activities undertaken by large firms, especially, those firms with relatively high R & D activities. In such a case, patents are almost the byproduct of R & D activities.

The increase of patenting in conjunction with the increase of firm's size is shown in Annex 1:3 in three United Kingdom based industries: chemical, electronical engineering and machine tools industries. The same Annex shows that non-patenting in the three industries is relatively small as compared to patenting. The non-patenting section of the Annex may in fact indicate that whenever an invention is possible to keep as a trade secret, firms tend to ignore taking patents providing that concentration and barriers of entry were high; Since, to take patents would only enforce an existing situation. Thus, the invention and the firm's interest become protected by the prevailing economic circumstances of the industry.

PATENT MONOPOLY VERSUS TRADE SECRET MONOPOLY

Inventors whether individuals or corporates can protect their industrial knowledge, either by keeping the invention as a trade secret or by taking a patent. To secure a monopoly without a patent protection, the inventor has to include manufacturing in his activities. Apart from a certain degree of market power, a sizeable investment is required before protection can take place.

The monopolistic position over competitors and potential profits may be lost if within a short period the invention becomes known to others. It is unlikely that individual inventors would gain an economic advantage from keeping their inventions as trade secrets since the above factors may not be available to them. Thus, the economic advantage of an invention which is kept secret will be demolished once it becomes public.

If the inventor chooses to secure his invention through a patent monopoly, the advantages over competitors would be lost by the expiry date of the patent life, as the invention will be freely available to competitors. If the inventor is an individual or a small firm, the patent monopoly may not in itself represent a real protection as competitors will be alerted to the invention's values. In such a case, competitors might proceed to produce it, especially if the risk of litigation was less significant.

The choice between either options depend on many complex issues

involving the invention in question, the rate in which technology is being developed in the field of the invention, the market position of the inventor and the current and future demand for the invention. If one assumes that an invention retains its commercial advantage, the loss to the inventor of keeping the invention as a trade secret or patenting it, is related to the time which passes between the date when the trade secret becomes known to others and the expiry date of the patent life [15]. In certain cases, the inventor can only keep his invention as a trade secret if the subject matter is unlikely to satisfy the patentability requirements.

Equally, the legal differences in both patents and trade secrets have advantages and drawbacks. Firstly, if the patent monopoly was to be favoured by the inventor then such monopoly will be territorially limited to the granting country or countries. On the other hand, it gives the patent holder the right to prevent others from using the patented invention in those countries which he holds a patent for the whole life of the patent. Secondly, the commercial benefits of trade secrets can be exploited worldwide with no territorial limitations and can continue to do so, as long as the invention is kept secret[16], whereas trade secrets do not give the holder the right to prevent others from developing or using the invention[17].

Process and product inventions are quite difficult to keep secret since it is possible for competitors to break up the secrecy through reverse engineering from products and services available in

the market.

In certain industrial fields (i.e. engineering and electronics), more and more role is being given to unpatented technology. In such fields, the complexity of trade secrets is quite substantial which makes it more attractive for companies to rely on head start coupled with economies of scale. Equally, the shift from market power through patenting to marketing techniques, product differentiation and advertising.

Jacob Schmooker^[18] has suggested that the number of privately hired inventors by corporations increased by sixfold in the United States between 1938-1954. In contrast, the number of patents taken out by corporates, increased only one of less than quarter. He cited the following reasons as the cause: (a) the hostile environment, politically and legally to patents; (b) slowness of the Patent Office operations; (c) more corporate dependence upon the advantage of the early start; and (d) more incentive input is needed per patent as technology becomes more complex.

There are certain circumstances where keeping an invention as a trade secret may be favoured by corporates:

(1) If the return on investment would be inefficient to justify the cost and risk of patenting^[19]. Such cost can be estimated from whether or not the market for a patented invention is limited, or if the invention was in a field where obsolescence is rapid which

makes it impossible to achieve a long run of production for a particular model. This was the case of the computer industry, where the fast improvement between 1950-1960, nearly led to the economic ruin of the industry and forced the British Government to intervene to save it[20].

(2) If the company was contractually bound to license its patents in certain areas to competitors, but does not wish its competitors to be made aware of the invention, especially if the agreement does not apply to trade secrets.

(3) If the invention was patented, and then ruled out as invalid. Or simply to avoid the risk of compulsory licensing which is required in many national laws, particularly when the company has no intention of working the invention in foreign countries[21].

However, no generalisation can hold when the discussion concerns patents, since it can be argued that patents are taken out by firms as a form of insurance designed to reduce uncertainty. In the sense that it might slow imitation by competitors, and that the commercial position of a firm is defended by the continued development of further products and processes.

There are those who argue that the grant of patent monopoly is not designed to induce inventors to invent, but rather to disclose their ideas, instead of keeping them as trade secrets. In order for social progress to take place in any society, knowledge becomes a

necessity. To ensure the flow of such knowledge, new ideas must appear continuously and if new ideas were not disclosed, new inventions would not become a part of the public stock of knowledge. So, the choice appears to be, between full disclosure rewarded by the patent monopoly, or a secret practice, to the extent and with all the safeguards that inventor's ingenuity can devise.

Patents if fully disclosed are a priceless background record of information which provides each industry with a chronological description of its particular art. Difficulties can be foreseen in advance, the path for related research may be followed, and new inventions may be discovered rapidly, thus saving both money and time. The user of disclosed information pay nothing for R & D which went into it, nothing for the instruction and nothing for the cost of failure. If inventions were kept secret, all such freely available information would need more money and time to gain access to it. However, the question of free information is ambiguous since it is not clear whether it is free for all or only in those countries where patents were taken out.

Nonetheless, examples exist where information disclosed through patent specification after it has expired has led to valuable research in the pharmaceutical industry where the improved drug may not have been discovered had the earlier invention not been disclosed[22].

For an invention to add to the public stock of knowledge it has

to be disclosed to an extent where a qualified person in the field can put the discovery into practice. If secrecy can be maintained, inventors are likely to keep their invention secret, it follows that the patent monopoly could in fact restrict the use of invention which cannot be kept secret anyway, rather than to disclose inventions. Even when patents are taken out, little is disclosed since examiners in patent offices and their experts are unlikely to have as much knowledge as those of a particular technological field. Thus, the exchange of patent monopoly for disclosure may be a one sided exchange: patent monopoly for secrecy. This is the case, when the disclosed information is insufficient as not to add to the public stock of technological knowledge.

PATENTS AND THE PRODUCTION OF TECHNOLOGY

The issue of the role of patents in the production of technology in our century may not be fully understood without taking into account the changing circumstances between the role of science and technology. In the past, technological innovations and improvements were largely the result of individuals with little or no scientific training. The link between science and technology was slight in the sense that research was not a function of manufacturing[23]. Pure science was separated from the production process and was autonomously developed, not because it was independent of society but because it was related to ideological superstructure rather than serving the production base[24].

At present, the link between science and technology has become increasingly close. The days of the individual inventors may have passed and in their place came industrial research laboratories. Inventors have become absorbed in research institutions, their skill highly evaluated and surrounded by expensive equipments. Patented technology is no longer the result of creative effort by individuals. It has become a captive technology, to the extent that it can be anticipated in advance. As a result of these changes, science has passed into direct service of technology through the closer association between the two fields and inventions have become less and less the result of genius flash, but rather a deliberate design.

The decrease of individual inventor's role in the process of technology production is being replaced by the increasing state support for R & D projects carried out by private enterprises.

(A) The individual inventor:

The discussion of the individual inventor in its modern form owes much to Jewkes, Sawers and Stillerman in their book "The Source of Inventions"[25]. The main conclusion in this was that individual inventors continue to play an important role in providing the society with new inventions, despite the increase of corporate R & D.

A sharp conflict of opinions exists between those who suggest that individual inventors are about to leave the scene or have already done so[26], and those who think that the days are by no

means over[27].

Patent statistics are assumed to provide strong evidence of the disappearance of individual inventors. Statistics show that the increase of firms inventions in the 20th Century is not only in terms of patents taken out by firms, but also in terms of the steady rising proportion of the total. In the United States, it is estimated that the proportion of corporate patents has risen from 18% in the beginning of this century to over 60%. Similarly, in the United Kingdom, the corporate proportion has risen from 15% in 1913 to 70% in 1960)[28]. When patent statistics concern single industrial fields, they tend to show that in some sectors, the role of individual inventors may have ceased to exist(29).

However, the reliability of patent statistics is being doubted by Jewkes on the grounds that not every corporate invention is patented while almost all individual inventor's inventions will be patented and that there is no evidence to show that corporates rely more on patents or trade secrets. Equally, there is no way to show how the rigorous standards of patentability have affected the individual corporate ratio, as what was patentable earlier may not be so today. These two grounds may not weaken the fact that the role of individual inventors in the production of technology is becoming less and less important. The fact that there is no evidence to show the rely of corporates on trade secrets may in itself suggest that corporates share is higher than what we know. As to the more rigorous standards of patentability, it might be true that the vast

existing body of knowledge had led to stronger examination systems, which in turn rendered the patentability of inventions more difficult. Once again, patent laws do not discriminate between individuals and corporate inventions. However, in practice the position of a corporate may well lead to an easier claim of patents.

The individual inventor over whose work no one has any control, who chooses his own field of research, who employs his own resources may not continue to exist in the future or only in a small number. This is mainly due to the fact that inventors require financial backing to test out ideas and to change ideas as well. Finally, because the individual inventor may not be able to make living out of his work, especially in sectors where costly and complex equipments are needed.

(B) The Role of the State in R & D

In all industrialised nations, governments work to promote and shape technological development. Each has concluded that free action of the market may not be sufficient to achieve the desired long term of technological strength and independence. Accordingly, the structure and the functioning of scientific and technological systems constitute an essential function of the state in most industrialised countries.

The theoretical justification of the state's intervention is based on the economic characteristics of knowledge as goods and the uncertainty relating to its production due to the indivisibility and

non-appropriation which characterise knowledge, and also because of the nature of economic systems in the capitalist framework, and the imperfection of the market. As a result, the optimal allocation of resources to the production of technology cannot be met or assured by the market mechanism[30].

The funding of scientific R & D by the State conceived in the present time as an investment in the infrastructure was not traditionally granted to the state. The intervention by the state can be seen at two levels, that of the global organisation of scientific system, and that of the articulation between scientific and industrial system. In this articulation, it is obvious that R & D expenditure attached to national defence plays an important role in so much as to exercise influence on the sectorial structure of industrial R & D.

The contemporary methods according to which technology or knowledge is inserted into the production system are characterised by (i) the role of the state at times in the funding of industrial R & D is a direct support for certain sectors and large enterprises in relation with military expenditure. The objectives to which public finance of R & D is directed in the United States, United Kingdom, Japan and West Germany are shown in Annex 1:4. (ii) The concentration of R & D resources in certain sectors, and large enterprises which control the technological changes; and (iii) the orientation of R & D towards new products, an orientation which tends to be attached to the size of enterprises and the intensity of the

sector technologically.

Based on Annex 1:4, two forms of state intervention can be distinguished. On one hand, Japan and West Germany, the military sector's influence is not as apparent as in the other three countries. The intervention is directed towards the institution of favourable climate, concerned with the support given to fundamental research and associated research of community services (i.e. health, anti-pollution). Equally, the intervention is designed to compensate for the weakness of private sector initiative in these fields and others, to create a generating infrastructure of external benefits. It is possible to think of this intervention in terms of socialisation of cost and risks, specially the support of basic R & D[31].

On the other hand, state intervention in France, UK and US correspond to a transfer of public funds to the private sector, either by complementing enterprises effort, or as an aid to specific projects[32].

The direction of public finance, makes clear that the orientation of industrial research - (carried out by enterprises) - is largely dependent on the objective set-up for public funded R & D. The social demand expressed through these objectives, notably in matters of defence, influence in a decisive manner the creation and distribution of technology. The effect of public funding of R & D is to reduce cost and risks[33], which private enterprises have supported and to render very important projects possible for the

private sector. The abridging of the delay between a basic idea and its commercial development which shows the evolution of innovation in the 20th century is attributed to State intervention despite heavy cost[34].

State intervention in support of R & D is re-enforced by the fact that the state acts as a client of the new products. The sectorial studies published by the O.E.C.D. in 1970, on technological gaps, underline the stimulating role by the public market in the field of electronics for example[35]. The development of a number of new branches was based on the principle of initial market which allowed enterprises to amortize the cost of research and to become later competitive in civil market. The space defence demand in the United States did not only stimulate the growth of the semiconductor and computer industries but also helped to stimulate and maintain competition in these fields[36].

Apart from the economic impact resulting from state intervention in the development and growth of high technology, the specification set by the military agencies and NASA accelerated the learning and improved production processes. Specifications set up by military and space agencies for the type of components they required, prompted competitors to develop semiconductors at least as good if not better.

The articulation between scientific and technological systems on one hand and the industrial system on the other have led to the concentration of resources of some large corporations and certain

sectors, as well as the orientation of product's innovation. When the two are attached to the behaviour of enterprises in an oligopoly situation, the result becomes obvious: the sectors and enterprises where R & D is concentrated, control and orient the technological changes. In such circumstances, competition is characterised by the existence of barriers of entry in the branch and by the behaviour of enterprises in matters of price[37]. The rejection of price competition and the acceptance of price fixing becomes the principle. New equipments become slowly adopted and only when there is an increase in demand that the enterprises of the sector may decide to adopt new equipments. This is due to the fact that the existence of barriers of entry govern the threat of new enterprises coming to the branch utilising new equipments and producing cheaper.

The situation is different in the other form of technological changes "product innovation". In this category of technology the freedom in fixing the price of new products represents a more favourable occasion for increasing the profit by introducing it to the market as soon as possible. The concentration of R & D in certain sectors is explained by the type of competition associated with the concentration of production. The sectors with intensive R & D (electric, chemistry, Aeronautic and electronics) are characterised by the oligopolistic structure of the market and the possibility to play product differentiation[38]. In these sectors, the technology does not constitute only an external barrier destined to prevent entry of competitors to the market, but also an internal one, since

it allows those firms to control the technical changes of products and processes. In other terms, technology in an oligopolistic structure has a double function, thus the aid of the state to those sectors in the form of public funding of R & D; assured demand and technological specifications amount to the support to enterprises confronted with competition[39].

The sectors where R & D is concentrated are also the sectors where the oligopolistic competition prevails. Consequently, the technological creation in these sectors covers the form of product innovation in conformity with an oriented strategy toward improving the retained part of the market and the increasing of profit margins. While in modern industries technological changes take the form of improving products, in the traditional sectors technical changes are related to improving processes and equipment. Thus, the increase in productivity in the latter sector is attached to the elevation of capitalistic intensity. The different occurrence of technological changes between the two sectors may on one hand explain the phenomenon of differential increase between industrial activities. Also, on the other hand, the relative play in the evolution of prices and the spreading of productivity benefits between industrial branches.

The unequal dynamism of the process of technology production of national economies can be explained through the analysis of the main features of the production of technology.

(a) The state intervention - (the government's overall expenditure on R & D) is a measure of commitment closely involved with the innovation process. The organisation of research in technical and scientific systems correspond to the institutionalisation of technological products.

(b) The degree of state intervention in organising the different system as a national system determines the character of technological production and international concentration of resources devoted to R & D which is the main source of technological progress. As well as the inequality of development, it also results in the technical changes being very inequally divided among nations.

(c) The inequality in the production of technology is the obvious result of the concentration of such production at international, sectorial and enterprise levels.

State intervention in the production of technology goes beyond the mere subsidisation of R & D, either by assuming directly a proportion of R & D, or by stimulating innovation through the awarding of governmental contracts to private enterprises. Or by granting aid to private individual projects to include education, scientific and technological information and tax incentive either applied to R & D only or to the purchase of sites and equipments. Equally important are the policies of the state with relation to the general condition of competition, such as anti-monopolies laws which are designed to stimulate competition which is in return favourable

to innovation. However most probably, the oldest form of state intervention in stimulating new technologies is the grant of patent monopolies.

NATIONAL PATENT LAWS

The extent of patent protection differs from one country to another. The main aspects and the fundamental differences among national patent legislations are discussed below, taking as examples the French and the US patent laws.

(i) Examination versus Registration: In France, the patent grant may be issued regardless of whether or not the claimed invention was patentable and noval. The only situation where a patent grant can be refused is if the invention was expressly excluded by law^[40]. The question of the validity of the granted patent is left to the courts to decide, as the examination of the application is merely a check on whether the application and accompanying documents are in proper form^[41]. If the requirements are satisfied, the application is then subjected to examination for novelty and inventive merits after which a documentation report is issued. The report is only of an advisory nature and not binding on the applicant. Whereas in the United States, an exhaustive examination system to establish the invention sought to be patented is in operation. The emphasis under the examination system is based on the official search which include novelty^[42], unobviousness^[43], foreign patents^[44], and

relevant literature.

Under either the registration or the examination systems, the ultimate test of patent validity is at court, since the law does not say to the patentee that his invention is entitled to protection but rather that the patentee is entitled to protect his invention. However, it appears that under the examination system if a patent was granted in most cases it will prove to be valid^[45]. The fact that the applicant is heard in secret without a record or an obligation to disclose the facts to his application has led to many criticisms of the American system. Such criticism was summed up by Justice Fortas as follows:-

"Most judges, rightly or wrongly, are inclined to think that a strong well financed applicant has pretty good chance of getting at least some patent claims allowed somewhere along the line, and they don't have much confidence in the process or respect for the results"^[46].

Most of the critics of the US examination system tend to compare it to the examination system of West Germany. For example, the numbers of issued patents to US residents between September 30, 1977 and September 30, 1978 was 70,292 patents out of 108,744 applications^[47]; or approximately 70% of applications were granted patents. In sharp contrast only 18,290 patents were granted in West Germany out of 60,095 applications in 1975^[48]; or 30.4% of all applications were granted patents. The lower percentage in West

Germany is due to the fact that it has the most rigorous examination system of patents which allows for public opposition, where competitors seek to destroy applications conflicting with their interest. A West German patent application is judged on the following criteria: novelty, progress in the art and inventive merit, the latter being the major cause for rejecting applications. Although the same criteria are required by the American Patent Law inventive merit does not play a major role. The high nullification of US patents seems to be caused by the fact that a US patent is so specific which makes it easy to nullify and to determine an infringement; while a West German patent is based on more general principles which is in favour of the patentee and rendering the patent more difficult to nullify.

(ii) First to file versus first to invent: Only the United States, Canada, and Philippines have a priority system which determines who should receive the patent grant if more than one individual have applied. Under the US Patent Law if an inventor can prove that he conceived the concept first, even though he had filed later, the patent monopoly shall be granted to him. The first to invent principle is deemed to have its justification from the individual point of view in the United States tradition since it avoids iniquities which may result from a race to the Patent Office if the first to file was adopted. Thus, in the US if a conflict between two inventors rises each claiming the same invention, the patent grant goes to the one who can prove that he was first to invent[49].

In France, the right to the patent grant belongs to the first to apply^[50]; assuming that the first to invent is likely to be the first to apply.

Less developing countries "LDCs", or at least those who are members of the Paris Convention for the Protection of Industrial Property of 1883, may avoid the full implications of the priority rights envisaged under Article 4 of the Convention if they were to adopt the first to invent principle. It is possible that an invention can be conceived first in LDCs, but because of the slow experimentation in these countries an inventor from a member country with a priority right of 12 months and more facilities would certainly beat the LDC inventor to the Patent Office.

(iii) Compulsory Licensing: The non-working of the patented invention is recognised under the French Patent Law as a ground for compulsory licensing. The applicant for such a license must prove that he has not been able to obtain a license from the patentee and that he can work efficiently^[51]. A compulsory license may be granted after three years from the grant or four years from the application, if without legitimate reasons the patented invention has not been worked effectively or the working has been disrupted for more than one year^[52]. Compulsory licensing can also be applied for in cases when a holder of improvement patent to a patented invention by another patentee cannot work his improved invention without a license from the earlier patentee. Equally it applies when the earlier patentee cannot work his invention in its improved form without a license from the owner of the improved patent.

In the United States, compulsory licensing is not allowed in most cases and the working of the patented invention is left to the patentee's discretion[53]. The patentee has no duty other than to spread the description of the invention on the record of the Patent Office. So, as soon as the patent expires the invention will be freely available to the public. He has no duty whatsoever to publish his invention to introduce it during the life of the patent. If the inventor chooses to leave the invention unused, there is no law in the United States to stop him from doing so.

It is doubtful, whether the US Patent Law with regards to the non-working of patented inventions contributes in any way to the constitutional objective "... to promote the progress of science and useful art ..."[54]. It is deemed necessary to impose upon the patentee the obligation to work the invention or let others work it under a license. Such necessity is based on the fact that the patentee monopoly is primarily granted to encourage industrial progress to an extent where the grant amounts to an implicit contract between the state and the patentee. Thus, to allow for the benefit of the invention to spread in the community, the grant of a patent monopoly implies that the patentee does exploit his invention in the granting country.

However, one may argue that the industrial progress is achieved despite the non-exploitation of the invention since the invention

becomes freely available at the end of the patent life. But, when one takes into account the rate at which technological changes are taking place in many industrial sectors, the argument cannot be held valid. The rapidity of the change makes it more likely that an invention becomes obsolete before the expiry date of the patent life. Consequently, no public benefit would have been derived from the patent monopoly.

Despite the foregoing argument the non-working of national patents does not provide any serious problems within national boundaries. The issue of non-working of patents is appropriately discussed within the context of the non-use of foreign patents in IDCs in Chapter Two.

Other aspects of the French Patent Law which cannot be found in the American system include the certificate of utility and the annual registration fees. Under Article 3, the certificate of utility - sometimes known as a petty patent -, is limited to six years and can be taken out for any minor invention or improvement other than medicine^[55]. More important, patent holders are required under the French Patent Law to pay an annual registration fee. The annual registration fee is designed to discourage firms and inventors from obtaining patents and using them for monopoly purposes without their exploitation. It also adds to the overall social cost of acquiring patents on products that are not made available to the economy in general. The provisions of annual fees were described by E. Mansfield as having the effect of serving to weed out worthless

patents[57]. Scherer agrees with such conclusion and argues that this provision of the law forces patent holders each year to assess whether or not it is worth maintaining their exclusive rights[58]. It might be possible that a significant number of patents are eliminated from the registry because of the annual fees provisions[59]. However, such provisions may not have a great impact in eliminating monopoly power, since companies will continue to pay fees for significant patents.

In both French and the American Patent Laws, the patent grant is designed to allow for a monopoly which is not limited in its scope to a reasonable return on investment, but rather offers very large profits to the patent holders. It protects the patentee's local market from imports and acts as an aid to the holder in gaining entry or remaining in foreign markets. To sum up both laws prohibit competition in the patented invention and that is the real reward to patent holders.

THE INTERNATIONAL PATENT SYSTEM

Under the principle of territoriality, the exclusive patent monopoly is only applicable within the boundaries of the country that conferred it. Furthermore, all legal dealings concerning the patent grant must be determined by the laws of that country. Accordingly, the protection of foreigners in the field of industrial property, prior to 1883, depended mainly on reciprocity between states. The

dissimilarities among national legislations meant that foreign inventors were met with greater and sometimes insurmountable obstacles to the protection of their inventions in foreign countries[60].

A widespread awareness began for the formulation of minimum rules and standards and to provide as much as possible uniform protection for inventors, which were to be observed by different countries. The development of manufacturing, communication industries and commerce in the 19th century, created new relations and new interests among nations. Thus, "when the international trade became critical to the economic life of what were then the major countries it became increasingly obvious that national regimes of exclusive rights in industrial and intellectual property in countries other than those of the inventor and innovators had to be created"[61]. Many countries felt the need of making use of the knowledge and experience, acquired in other countries which enacted industrial property rights before them[62]. In the words of LADAS, the international protection was "still primitive"[63] prior to the Paris Convention of 1883 and non-nationals still suffered from the effects of the dissimilarities of national property laws.

The first attempt to lessen the difficulties inherent in the principle of territoriality was the Convention for the International Protection of Industrial Property - better known as The Paris Union of 1883. The industrial power nations at that time played a major role in the evolution of the international patents regime[64].

It is important to note that from the start there was opposing views with regards to the grant of a patent monopoly. The opposition was not based on the improvement of the patent regime, but rather on its abolition[65]. In England the patent Law was brought up for consideration two hundred years after it was first introduced in the Statute of Monopolies of 1623[66]. In Germany the position was almost unanimous in condemning the patent protection[67].

The organisers of the Vienna Conference of 1873 were aware that in a competitive economy, the world could not be half with patent protection and the other half without it. Under such circumstances, the patent monopoly in the granting countries becomes a non-profitable restriction since the same invention without limitation or price increase becomes a common property in the neighbouring non-patent protection countries[68].

The 1873 Conference settled the issue of patents versus no patents by adopting a resolution which affirmed that the right of the inventor "should be protected by all civilised nations"[69]. Another dispute involved the US who supported the notion of patents as a private property right and the host country Austria who viewed patents as a public policy instrument, and thus allows for the forfeiture of patent rights, if local manufacturing did not begin one year from the grant of monopoly. The problem was whether or not the patentee has the right to lock up his invention and not allow anybody to use it. At the end, the notion of patents as a property right was adopted by most of the European countries except Germany, Holland and

Switzerland^[70]. Nonetheless, as previously explained, the notion of patents as a public policy instrument appears to prevail in most present patent legislations of both developed and developing nations.

The International (Paris) Convention for the Protection of Industrial Property of 1883 was adopted on March 20, 1883, and came into force a year later, on July 7, 1884^[71]. The Convention is governed by four major Articles relating to:-

1. National Treatment:

Under Article 2(1), the reciprocity of treatment for individuals and states was rejected by the Convention and instead the equal treatment principle was endorsed:

"Nationals of each of the countries of the Union shall, with regards to the protection of industrial property, enjoy in all other countries of the Union the advantages that their respective Laws now grant or may thereafter grant to nationals without prejudice to the rights specially provided by the present convention"^[72].

According to this provision, a patent holder in a country is subjected to the laws of that country with regards to patent protection and intellectual property in general and not to the laws of his country. In practice a patent holder from a non-member of the Union enjoys the same benefits in the member country since the provision does not allow him to claim the same treatment he receives

at home. If the holder was allowed to receive different treatment, local competitors may be affected in cases where the home treatment contains more economic advantages than those which exist in the country where the patent is taken out.

2. Import Monopoly:

Article 5(a) provides that importation of patented articles in the countries where patents are taken out cannot be ground for the forfeiture of patents. In other terms, such provision appears to suggest that the monopoly to import should prevail, or that the patent monopoly is in fact a license to import. Since without such provision, the foreign patentee will be forced to set up manufacturing facilities in each of the countries where he chooses to take patents.

3. The Priority Right:

Under the provisions of Article 4, inventors are allowed to acquire patents in all member countries with a 12 months period limit of priority^[73]. Within one year from the filing date in the country of origin, the patentee must apply in the Union member countries if foreign patenting is considered. The priority right is designed to overcome the disadvantages of prior publication which would destroy patentability. Thus, the inventor can with the help of the priority right principle take patents in more than one country. If no priority right exists, inventors will be forced to file a single application. Such single application may be filed in countries where it would be of greatest value to him. If such

proposition was allowed to occur, it could lead to the concentration of knowledge in few leading countries, mainly in the industrial power nations.

However, the assumption that technological knowledge will be concentrated without the priority right principle is misleading since it is already concentrated in the industrialised nations. Furthermore, technological knowledge still can be transferred through licensing agreements which may be an effective instrument of combating abuses of non-working of patents and their use as import licenses.

4. The Independence of Patents:

The independence of patents principle is an inevitable consequence of the fact that countries remain free to decide for themselves on matters such as patentability, renewal duration and so on. In this respect, the principle is consistent with the notion of each country settling down its own standards with regards to the grant of patent monopoly. However, the result of such dependence means when a patent is invalidated in one country it will not be automatically invalidated in other countries. This is due to the fact that the patent life is governed by the laws of the granting state rather than the country of origin.

Finally, the Paris Convention as a whole appears to be designed to favour large companies. It is unlikely that the Convention could have a significant impact on either individual inventors or small

firms, since the international scale of operations may be beyond their means. The only way in which they may benefit from the international protection of patents could be in the nature of bonuses.

The picture is different for multinational companies for which research and development efforts are directed at world wide markets and international operations are an essential element of companies structure. Thus, the international protection of patents would certainly have positive effect on their incentive to invent. These advantages are further enhanced by the independence principle as the chances of acquiring at least one patent through worldwide application are higher than for a company with a single application.

The Paris Convention of 1883, although remains the cornerstone of the present international protection of industrial property is by no means the only effort in this field. Various international and regional agreements have come into being since.

A - INTERNATIONAL AGREEMENTS

1. The Convention for Establishing the World Intellectual Property Organisation:

The WIPO Convention was adopted at Stockholm in 1967 by the same diplomatic conference which revised the Paris Convention for the

sixth time[74]. It contains no substantive treaty obligations concerning the national laws of member states in the field of intellectual property. Unlike any other convention, it is open to non-member states of any of the Unions which WIPO administers[75]. By virtue of the Convention WIPO is entrusted with (i) the promotion of the protection of industrial and intellectual property worldwide, and (ii) to ensure administrative cooperation among Unions established by multilateral agreements for the promotion of intellectual property[76].

2. The Strasbourg Agreement Concerning the International Patent Classification:

The Strasbourg Agreement was concluded in March 1971, as a special agreement within the framework of the Paris Convention. However, the International Patent Classification (IPC) itself has been in force among certain states belonging to the Council of Europe since 1968[77]. Since the majority of national patent laws consider that a patent issued in another country is prior art, the patent examiner of the country where the application is filed must search out all patents closely related to an application. Thus, examiners faced a difficult and a time consuming job because of the different systems of classification employed by countries worldwide. To ease this task, the Strasbourg Agreement provides for a system to be known as the "International Patent Classification" (IPC).

Under the IPC, technology is divided into eight main sections.

The eight sections are divided into classes, which are themselves further divided into approximately 51,000 subdivisions[78]. These classification symbols are reserved for national patent offices and appear on patent documents (published patent applications or patent grants)[79]. The IPC Agreement is in itself an element without which it would be more difficult to image the Patent Cooperation Treaty.

3. The Patent Cooperation Treaty (PCT):

In order to extend its bilateral approach of search[80] into a broad-based international approach, the United States proposed at the executive meeting of the Paris Union on September 29, 1966 "that the Director of the BIRPI undertake urgently a study on solutions tending to reduce the duplication of effort both for the applicant and national patent offices ..."[81].

The PCT provides for a "Union for cooperation in the filing, searching and examination of applications for the protection of inventions"[82]. The PCT, basically, aims at reducing the cost and complexity of international filing of patent applications for both the applicant and national patent offices and the applicant[83]. The saving of effort for national offices would primarily consist of receiving search reports and possibly also preliminary examination reports, both of which would considerably reduce the work of examiners. As to the applicant, the PCT allows him to file a single application (in one place, in one language, for one set of fees) which will have the effect of a national application, in each and all

of the contracting states in which he is seeking protection.

The PCT consists of three features: internal application, international search and international preliminary examination. The first two features constitute what is known as the "First Phase" of the PCT. Equally, these two features are inseparable in the sense that the only way for an applicant to get an international search is through international filing of applications, and that all international applications are subject to international search[84]. The third feature - international preliminary examination constitute "Phase II" of the Treaty and is optional. Any contracting state could decide not to adhere to his "Second phase" of the Treaty and each applicant could decide not to take advantage of the international preliminary examination[85].

The First Phase provides for the filing of international application by the applicant in his national patent office (the Receiving Office) where protection is sought in several countries[86]. The Receiving Office would check the application to see whether or not it complied with the minimum requirement which would enable it to acquire a filing date[87]. The same receiving office would send a copy of the international application (record copy) to the International Bureau and a "search copy" to the Searching Authority and one copy "home copy" shall be kept by the receiving office[88].

It is expected that the International Patent Institute[89]

will be one of the Searching and Preliminary Examining Authorities. However, Article 16(2) is so constructed that even the establishment of a single International Searching Authority could be instituted if the Contracting States desired so^[90]. The Searching Authority would try to discover any relevant prior art and would establish a report (search report)^[91]. The search report would first be transmitted to the applicant and the International Bureau^[92], then together with the application it would be sent to the designated Contracting States.

Under this First Phase, the filing of international application would have two legal effects. (i) It would have the effect of a national application within each and all the designated contracting parties. The practical consequence of this is that the application could cause the existence of applications in many countries by filing a single application in one language and paying a set of fees. (ii) The processing of applications before national patent offices would not start at least until the expiration of 20 months - (except at the express request of the applicant) -, and normally until the international search report has become available^[93]. Thus the national processing will start under far more advantageous conditions for both the applicant and the national patent offices. For the applicant there would be a more informed opinion of the value of his inventions, while for national offices the examination task would have been partly completed - (namely, the searching for prior art).

The Second Phase - international preliminary examination is

optional in the sense that any contracting state could decide not to adhere to those provisions^[94] and each applicant could decide whether or not to take advantage of this Phase^[95]. By contrast to searching the international preliminary examination is a highly subjective procedure which allows the Preliminary Examining Authority^[96] to determine it, on the basis of the prior art discovered, the claimed invention met standards of worldwide non-obviousness, usefulness (industrially acceptable) and was novel^[97]. The international preliminary examination report, apart from being non-binding^[98], would not contain any statement on the question of whether or not the claimed invention is patentable according to any national law^[99]. The earlier PCT draft of 1967 had envisaged the issuance of an International Certificate of Patentability^[100]. However, such term was abandoned in the signed Treaty because it proved impossible to unify substantive patent law with regards to the applicability of the criteria of novelty, inventive advance and industrial application^[101].

The only legal effect of adhering to the Second Phase would be as already indicated - that the processing of the application before national offices would be delayed at least until the expiration of 25 months^[102] and normally until the international preliminary examination report has become available. Otherwise, the Treaty makes no provision for the national phase.

THE MAIN ADVANTAGES OF THE PCT

The major advantages of the PCT concerns the benefits to be gained by both the applicants and the national examining patents offices which are almost exclusively connected with industrialised countries. However, the Treaty also contains significant advantages for developing countries.

Firstly, the applicant would have more time to make up his mind in selecting the foreign countries in which he wants to seek protection. He would also spend less in terms of cost prior to the grant of patent than at present^[103]. Both the search report and international preliminary examination report helps the applicant to make up his mind on whether it is worthwhile continuing his effort and to press for national patents.

Secondly, the national examining Patent Offices would be able to make substantial economies, since most of the work of searching and part of the examination for applications by foreigners, will become available through search and preliminary examination reports. It is important to note that in the overwhelming majority of countries foreign applications exceed the national ones (except in the United States, Japan and West Germany) ^[104], but even in these countries the number of foreign applications is in itself impressive. Whether national patent offices follow a system of examination or registration, such offices under the Treaty would make economies in the cost of handling applications, as their work of verification

would become practically superfluous.

Thridly, for developing countries the "dilemma between the danger of a distorted patent system and the practical difficulty if not impossibility, of marshalling the broad range of highly qualified technicians and scientific source materials which would be needed to permit an adequate novelty search"[105], finds a solution within the framework of the PCT. Furthermore, the majority of developing countries have a non-examination system coupled with a high rate of foreign patenting. Therefore, the chance of granting worthless patents by developing countries cannot be ruled out by expertise examination and courts as in the developed countries[106].

Based on these facts, the PCT may offer a practical solution to a practical problem, since manpower and scientific materials would not be required to make a novelty search or even preliminary examination[107]. However, this solution embodies a continuous dependence in matters of search and examination if it is to be taken other than a short term solution. Although the Treat (Art 51) provides for the establishment of a Committee for Technical Assistance, to help the Contracting developing countries in developing their patent systems (to train specialists, to loan experts and to supply equipment), it does not totally satisfy the expectation of developing countries. The treaty could have included more positive and specific provisions with regards to such assistance, for example to make it obligatory for the International Searching and Preliminary Examining Authorities to take trainees from

developing countries.

Nonetheless, under the PCT, the patent systems of developing countries would not be distorted since the international application accompanied by search and preliminary examination reports would give a high degree of reliability to their patent grants. In other terms, the PCT may protect developing countries from granting unjustified monopoly restrictions to foreign applicants[108].

B - REGIONAL AGREEMENTS

One of the earliest regional agreements in the field of industrial property was the Montevideo's Convention on Patents of invention of January 16, 1889[109]. This Convention provided for reciprocal treatment and a priority right of one year[110]. A subsequent and more significant inter American Convention of Inventions was signed at Buenos Aires on August 20, 1910 and has been into force since[111]. It is modelled on the Paris Convention (i.e. adopted the principle of national treatment, priority right and independence of patents embodied in the said Convention), and remains in force among 14 states including the United States. A further Convention was signed at Caracas on July 18, 1911[112], between the countries which form the present Andean Pact. Anyone obtaining a patent for the first time in any of the five countries will enjoy national treatment, providing he registers his patent within the maximum period of two years. These agreements allow a

non-member of the Paris Union to obtain some benefits of the Union and at the same time remain free to deal only with selected countries (i.e. Bolivia which is not a member of the Paris Union but a member of the Buenos Aires Convention of 1910).

In Europe there have been several conventions which unlike other conventions were not limited to easing some of the disadvantages of territoriality, but also attempted to unify certain aspects of patent laws. Among these, the European Convention on the International Classification of Patents for Invention of 1954 and which has been transformed into an international agreement - (the Strasbourg Agreement). The Council of Europe which is composed of a majority of Western European countries, has taken several steps towards the harmonisation of patents[113]. The initial step towards harmonisation was the European Convention Relating to the Formalities Required for Patent Applications signed at Paris on December 11, 1953[114]. The last and most ambitious step taken by the Council was the European Convention on the Unification of Certain Points of Substantive Law on Patents for Invention, signed at Strasbourg on November 27, 1963[115]. The Convention provides for certain uniform principles such as the definition of novelty and patentability. The provisions embodying these principles makes the Convention less likely to be adopted in the near future, since they necessitate changes in the patent laws of several member states.

However, the first European attempt to construct a completely new supernational patent system was the European Patent Convention

(EPC) of 1973[116]. The EPC provides for the establishment of an European Patent Office and European patent[117].

To further the economic and political integration among EEC countries, the Community Patent Convention (CPC) was signed in 1976[118]. Unlike the EPC, the CPC is not yet in force, and is unlikely to be so for some considerable time[119]. By contrast with EPC, the CPC provides for a unitary patent grant throughout the EEC members[120]. The community patents is in effect an European patent, which is governed by the EPC provisions and enjoys a unitary character within the EEC[121].

In Africa, efforts to obtain greater unification and administration of patents has been implemented by the African and Malayasy Industrial Property Convention[122] - (Office Africain et Malgache de la Propriete Industrielle (OAMPI)) signed at Libreville on September 13, 1962[123]. The main principles on which the Libreville Accord is based are centralisation, protection and sovereignty of each of the member states and complete equality among them. A Central Patent Office was initiated by the Accord located at Ya Ounde (CAMEROON) which has the duty to register the filing of applications, to apply the administrative procedure and issue patent grants that are effective in each member state. However, those rights are regarded as a separate national right for which the courts of specific countries are competent[124].

NOTES: CHAPTER ONE

1. R. VERNON (1977) "Storm over the multinationals: problems and prospects", Foreign AFFAIRS, VOL 55 pp243-245.

2. Peter Nanyenya - Takirambudde (1980) "Technology transfer and international Law" PRAEGER pl0.

3. A patent was defined by the world Industrial Property Organisation "WIPO" as follows:

"a patent is a legally enforceable right granted by virtue of a law to a person to exclude, for a limited time, others from certain acts in relation to a new described invention; the privilege is granted by the government authority as a matter of right to the person who is entitled to apply for it and who fulfils the prescribed conditions"

The definition was provided by the WIPO for the purpose of the Secretary General Report "The role of the patent system in the transfer of technology to developing countries" UNCTAD TD/B/AC.11/19, p3 (UN Publication Sales No. E.75.11.D.6).

4. J. E. S. Parker (1978) "The Economics of innovations" Second Edition, Chapter 11, patents pp294-295.

5. William Kingston "Inventions and monopoly" WOOLWICH ECONOMIC PARER no. 15 pl4.

6. XVENNEVAR BUSH (1977) "Of inventions and inventors" Research Management July; p28.
7. President Johnson in releasng the report "Patent Reform Act 1967" of February 21, 1967, to the Conress: House Document No. 59, 90th Congress, First sessoin. As cited by GEORGE E. FROST (1967) "Patent System proposal: How critical" HARVARD Business Review September-October 1967 pl12.
8. Floyd L. Vaughan (1948) "Patent policy: A discussion" American Economic Review; Papers and Proceedings pp215-234.
9. J. B. CLARK, in his Essentials of Economic Theory (Ch. XX) as cited by ARNOLD PLANT (1934) "The economic theory concerning patents for invention" Economica, February p41.
10. IFO, from a paper entitled "Patent and license policy" Institute for Economic Research, Munich, April 3, 1974; in ARTHUR GERSTENFELD (1977) Innovation: A Study of Technological Policy" University Press of America p61.
11. It is difficult to distinguish in advance between patent dependent and non patent dependent inventions, but it is possible that few patent dependent inventions could make a big difference in the quality of life the production efficiency and that may prove to be the major obstacle in abolishing the patent system.

12. Memorandum of Harford Empire Company, presented by the Commissioner Coe in "Investigation of Economic Power" Part III, p842, as cited by A. E. Khan (1940) "Fundamental Difficiencies of the American Patent Law" American Economic Review p485.
13. F. L. Vaughan (1948) " Patent Policy" op. cit. p218. He considered the patent system as an evil which causes restraint of trade and that dominance in field of an industry can also be achieved through patent pools between competitors in the same field.
14. F. M. Scherer (1965) "Firm size market structure, opportunity and output of patented inventions" American Economic Review pp1097-1123.
15. A trade secret is defined as:

"A plan or process, tool, mechanism, or compound known only to its owner and those of his employees to whom it is necessary to confind it".

"A secret formula, or process not patented, but known only to certain individuals using it in compounding some article of trade having a commercial value".

BLACK'S LAW DICTIONARY, ST. PAUL Minosota, West Publishing Co., Revised 4th Edition (1968). And by Bloxam "The term is substantially equivalent to know-how in its more general sense, specially favoured in the legal usage in the United States".

BLOXAM. G. A. (1972) "Licensing rights in technology: A Legal

Guide for managers in negotiations" Grower Press London.

16. Trade secrets utilised in products and processes carry in indefinite commercial life provided that they are not revealed, rendered obsolete, or the secrecy has been discovered. Few examples exist of trade secrets being kept secret and continued to bring commercial benefits. The best known example, is that of Coca-Cola whose world-wide used trade secret formula has been maintained since 1896, and yet to be broken. See E. JANET Barry in "New Products, new profits" American Economic Management Association Inc., New YORK CITY (1964) pp93-99.
17. The French process for producing Cellophane, kept secret by a French company early this century and despite efforts in time and millions of dollars spent by Du Pont unsuccessfully to develop a similar process, Du Pont finally had to take a license from the French company. See Roger M. Milgrim (1974) "Get the most of your trade secrets" Howard Business Review Nov/Dec pp105-112. The oldest trade secret is that of the Zildjian family whose metallurgical secret for making cymbals has been preserved since 1623, which is more than 20 times the life of a US patent (17 years). See William Bowen (1964) "Who owns what's in your head" Fortune, July, p175.
18. JACOB Schmooker (1966) "Invention and Economic Growth" p29.

19. There are certain costs which can be identified, such as the cost of filing a patent application and prosecuting it, which are multiplied by the number of foreign countries if foreign patenting is concerned. There is also the cost of maintaining a patent protection, which rises sharply after the patent matures in most countries.
20. See PARKER (1978) op. cit. p315.
21. Roger Milgrin (1974) op. cit. pp105-112.
22. The marketing Director the American Cyanamid's Lederle laboratories claimed the following:-

"My company put millions of dollars into the research leading to the discovery of Aureomycin. This represented years of work and the screening of 30,000 substances for antibacterial properties of the molds they contained. Without the assurance of a strong effective patent law, this research would never have taken place. Aureomycin might not now be in the physicians arsenal".

As cited by E. JANET BARRY op. cit. p95. Based on the disclosed information of this patent, several companies, came up with Tetracycline, which replaced Aureomycin as the drug of choice in its sphere of antibiotics activities.

23. Samir Amin (1977) "Imperialism and unequal development" Monthly Review Press (Chapter 10). Amin cited the following causes as having led to the closer link between technology and science: (i) the progress in physical and biological sciences; (ii) the systematical application of mathematics to serve science; (iii) technology is now derived explicitly from science; and (iv) the shift from mechanical engineering to electronics.
24. John Jewkes, David Sawers, Richard Stillerman (1969) "The source of inventions" Second Edition (Chapter 2 pp34-39).
25. Ibid.
26. "The days when one individual's inventiveness and enterprises could transform an industry are in the past". A. Hunter (1956) "The Control of Monopoly", Lloyds Bank Review. October.
27. Sir Edward Appellton does not agree with those who suggest that the day of individual inventors are over. "Many people nowadays are inclined to think that because of rapid development of technology, the day of the inventor is over. I do not agree". See the Listener November 22, 1956. The same view is also supported by DR. BUSH "A great change is occurring in the way that technical innovation came out. The day of the lone inventor is not quite over, but it has been vastly changed ... advances in technology are being made today by teams of individuals in laboratories where it is not so much a spark of

ingenuity that counts, as it is a knowledge of physics and mechanics and painstaking in development". VENNEVAR BUSH (1971) "Of Inventions and Inventors" Management Research, July, p35.

28. Individual inventors still provide an important number of inventions, 40 per cent in the US and 30% in the UK in 1960. See Aubrey Silberston (1967) "The patent system" Lloyds Bank Review, April, p37.
29. The share of corporate patents in the chemical and related arts increased from 34% in 1916 to 85% in 1945 in the US. JEWKES et al op cit pp88-89.
30. Among the motivations for governmental support of R & D efforts in the United States are the following:- (i) the inability of private firms to appropriate adequate profit from R & D for themselves resulting in under investment in R & D; (ii) national security; (iii) the indivisibility of research preformance which inhibit any one firm from persuing a research project; and (iv) a version to risk of R & D by industrial firms and large scale development requirements beyond the capacity of an industrial sector. See William A. FISHER & GUY BLACK (1979) "Federal Funding of Industrial R & D" Management Research September pp27-30.

31. The German aid seeks to influence the climate for "innovation" through direct measures. The principal thrust of the German policy is to reduce the cost of R & D to private firms and to encourage large technically based corporation in advanced area. The relatively high level of cooperation which exist among industries, universities and government is positive in the German environment for innovation.
32. For example 89.3% of public funds in 1976 went to 58 firms with the largest laboratories. The same number of firms carried 67.1% of private R & D in the same year. D.G.R.S.T. (1978) "Recherche et Developpement dans les entreprises 1976" la Documentation Francaise, PARIS, p54.
33. For example, in West Germany, there is what is known as the first innovation programs, under which the Government meets 50% of the cost of commercial development of promoting new technologies, with an interest free forgivable loan. If the effort fails the loan is cancelled. Key technologies and big science projects, receive high priorities, the first are focused specially on industrial innovation and include direct government cost sharing with industry.

In France, all R & D expenses are deductible, and for income tax purposes, there is an accelerated depreciation for R & D facilities, tax deductions are also allowed for capital invested in R & D facilities by new organisations, and payroll

tax support for retraining of manpower.

34. F. LYNN (1966) "An Investigation of the rate of development and diffusion in our modern industrial society" Report of the National Commission on Technology, WASHINGTON.
35. O.E.C.D. (1970) "Technological gaps" PARIS.
36. For the role of US Government and its influence on the semiconductor and computer industries, see Jarome R. Schnee "Government Programs and the growth of high technology in industries" in Michael L. Tushman, William L. Moore (1982) "Readings in the Management of innovation" Pitman Publishing Ltd., Section VI pp595-611. According to Schnee, the semiconductor industry received between 1955 and 1961 the amount of \$66 million for R & D, and where the share of defence and space agencies, at times was almost 50% of the output.

In Britain, a paper prepared by the National Economic Development Office "NEDO" shows that Britain spends about £3.5 billion a year on R & D, and a large sum of it goes to defence. The sum of £250 million is also suggested to finance R & D in the computer industry in the next 5 years, see THE OBSERVER, Sunday August 1, 1982, p17. A recent joint report of the Advisory Council for Applied Research and Development and the Advisory Board for the Research Councils, published by the Stationery Office, provides that the UK Government spent on all

R & D in 1978, the amount of £1,650 million, out of which 1,060 million was devoted to defence or more than 64 per cent. Richard Norton Taylor (1983) The Guardian, Wednesday July 6, p2. Equally, France plans to spend 140 billion Francs (£11.8 billion) in the next 5 years in the electronics sector, see the FINANCIAL TIMES, THURSDAY 29 July, 1982, p1.

37. P. SYLDS. LABINI (1969) "Oligopoly and Technological Progress" HARVARD UNIVERSITY PRESS.
38. W. S. CAMANOR (1967) "Market Structure, product differentiation and industrial research" Quarterly Journal of Economics, November pp639-657.
39. France's science and technology policy has been characterised by heavy Government support for civilian technology notably computers, aircraft and nuclear energy. The French technological policy is dictated by France's political commitments to industrial and technological independence, the objective of which is to maintain at least one domestic supplier in every important industry. It is a policy which frequently requires intensive government subsidies to weak industries, encouraging mergers of companies into stronger national entities to respond to foreign competition.
40. French Patent Law LAW No 68-1 January 2 1968. Journal Officiel de La Republique Francaise January 3, 1968 ppl3-18 Article 11.

41. Ibid. Articles 13-27.
42. United States Patent Act of 1952, Section 102, lists of the conditions under which the novelty of invention may be destroyed. 35 USC PART TWO.
43. Section 103 of the 1952 Act deals with unobviousness. In cases where the subject matter of the invention together with the obvious art, would have been obvious to a person with ordinary skill, the patent grant may be refused. For further details on the American Patent Law see George E. FROST (1967) "Patent System Proposals: How practical?" HARVARD Business Review, September-October pp111-122.
44. Section 104 and sections 131-135 deal with inventions made abroad and examination procedures.
45. The American examination system has been criticised on the grounds that it is neither strong nor reliable. Bernard Nash estimates that 70% of patent applications result in patents grant and the relatively litigated patents resulted in 70% found invaild. BERNARD NASH (Assistant Councel, Sub-Committee on Anti-trust and Monopoly) (1977) "The Patent Reform Bill: the pro-side" Management Research ppl2-15.
46. Justice FORTAS (1971) "The Patent system in distress" 14 IDEA pp571-576.

47. Management Research (1979) "Patent Notes" MAY, p5.
48. B. NASH (1977) op-cit table 1 pl4. See also Annex 1:5.
49. From a practical point of view, the first to invent principle may be more difficult to enforce as examiners must determine the first conception date, and the inventor must keep a well documented record of his work.
50. French Patent Law No. 68-1 op. cit. Articles 1 and 22.
51. There are cases where the Government could intervene directly to obtain licenses: (i) when the subject of a patent or a patent application, necessarily concerns national defence. The working of such invention can either be done by the Government or on its behalf (ii) to safeguard the public interests in the health service in cases where a patented medicine is not available to the public in a sufficient quantity or quality, or the price charged for such a medicine is excessive. Under such circumstances, the Ministry of Health may subject the concerned invention to a "license of right" and would be immediately available to qualified parties. (iii) the non-official working of the invention. If the Minister of Industrial Property comes to the conclusion that the need of the national economy was not satisfied, the patent owner is given one year to remedy the working deficiencies. By the end of the one year notice and if the deficiencies were not put right, the patent may be

subjected to a license of right.

The terms and the conditions under the above circumstances are agreed by the parties in the first instance and settled by a court of Law if no agreement was reached. Law 68-1 op. cit. Articles 37-40.

52. Other conditions concerning the grant of a compulsory license include: (i) the applicant must prove that he can work the invention up to the market requirements. (ii) the license shall contain specific conditions for the duration, scope royalties and must be non-exclusive. (iii) Only courts can alter the terms of the license at the request of either party. (iv) The assignment of license of rights must be approved by the courts. (v) the license may be cancelled if the licensee fails to comply with the conditions of the grant; and (vi) if the licensor fails to take action upon a request from the licensee, the latter may take action for infringement. Law 68-1 op. cit. Articles 32-36.
53. Compulsory licensing is provided for under special statutes: (i) The Clean Air Act of 1970, which is in fact an amendment to the Air Quality Act of 1967 (42 USC, sections 1858-18571. Supp V. 1970); (ii) the Atomic Energy Act (42 USC, section 2183-2184). The Act empowers the Atomic Energy Commission "AEC" after a hearing to declare any patent to be effected by the public interest and compel licensing. See JEFFERY G.

GERBER (1972) "Compulsory licensng of patents under the Clean Air Act of 1970" PATENT LAW REVIEW ppl47-180.

54. The Constitution of the United States of America, 92 Congress, Senate Doc. 92-82, US Government Printing OFFICE, WASHINGTON 1973. Article 1 Section 8 p312.
55. No examination procedures are required with regards to the novelty of the certificate of utility.
56. Law no. 68-1, op. cit. Article 41.
57. E. MANSFIELD (1971) "Technological change" Norton. New York pl32.
58. F. M. Scherer (1970) "Industrial market structure and economic performance" R and M Nally p305.
59. See Annex 1:5.
60. As far as foreign inventors were concerned the diversities related to (i) what was a patentable invention?; (ii) administrative procedures of the grant; (iii) term of patents and taxes; (iv) obligations of the patentee; and (v) conditions and formalities necessary for the granting of a patent. For further details on the diversities among national legislation prior to 1883, see LADAS. P. STEPHEN (1975) "Patents,

trademarks and Related Rights, National and International Protection" Volume 1, HARVARD UNIVERSITY PRESS 1975. Chapter two.

61. PETER N. TAKIRAMBUDDE (1980) op. cit. p61.

62. LADAS P. STEPHEN (1975) op. cit. Chapter 4 pp59-94.

63. Ibid pp54-55.

64. The role of the industrial power nations is evident from the invitation issued to the Conference in 1872. Despite the fact that it was made by the Austrian Government, it stated clearly:

"Following a suggestion of the Government of the United States of America, the General Director of the Universal Exposition intends to unite with the Exposition on International Congress which shall discuss the question of patent rights".

As cited by H. KRONSTEIN and IRENE TILL (1947) "A re-evaluation of the international patent Convention" Law and Contemporary Problems VOL 12 pp675-781, LADAS. P. S. (1975) op. cit. Chapter 4 pp59-67; and PETER N. T. (1980) op. cit. p62.

65. The main opponents included: Germany, France, Switzerland, Holland and England, the latter having played a central role in the introduction of the patent system in the first place. All were in fact chief proponents of a free enterprise market.

66. Statute of Monopolies 1623, in Statutes in Force; Official Revised Edition, London H.M. STATIONERY OFFICE (Revised to 30 April 1979); E. W. HULME (1896) "History of the patent system under the prerogative and at Common Law" Law Quarterly Review pl41. The patent system was investigated by Royal Commissions and Select Committees of Parliament in 1851-52; 1862-1872. See FRITZ MACHLUP and Edith Penrose (1950) "The patent controversy in the Nineteenth Century" Journal of Economic History Vol. 10 ppl-29. The abolition of patents was proposed in the two Houses of Parliament which led an American writer to suggest that "L'Angleterre parait s'acheminer vers une abolition complete de ce systeme" Revue de Droit International et de legislation comparee (1869) p311.
67. The Congress of German Economists of 1863 adopted the following resolution: "Considering that patents hinder rather than further the progress of invention; that they hamper the prompt general utilisation of useful inventions; that on balance they cause more harm than benefit to the inventors themselves and, thus are highly deceptive form of compensation". Cited by F. MACHLUP and E. PENROSE (1950) op. cit. p4.
68. The Vienna Conference of 1873 was followed by the International Congress on Industrial Property at Paris, from 5-17 September 1878; the International Conference at Paris, November 4 to 20, 1880; and the International Conference at Paris, March 6, 1883. For further details on these Conferences see S. LADAS (1975)

op. cit. Chapter 4, pp59-71.

69. Ibid p60.
70. Journal Official de la Republique Francais (1878) p9151.
71. The eleven signatories countries of the Covention were: Belgium, Brazil, France, Guatemala, Italy, Netherlands, Portugal, El-Salvador, Serbia, Spain and Switzerland. These states met in Paris on June 6, 1884, where the deposit of Acts of concession to the Convention by Great Britain, Ireland, Tunisia and Ecuador had been accepted by the French Government. The Convention came to force on July 7, 1884. For the original text of the Convention and the final Protocol see DE CLERQ, Recueil de traites de la France, XIV p203. The Convention is now administered by the World Intellectual Property Organisation "WIPO", which is the successor of the Bureaux Internationaux Renus pour la Protection de la Propriete Intellectuelle "BIRPI.
72. Article 2(1), dealing with National treatment.
73. It should be noted that in the original draft the priority right for patents was six months. This was at a time when communication was far lower than what it is now and even then some deligates felt that the period was too long.

74. The Paris Convention of 1883, has been revised six times so far: Brussels (1900), Washington (1911); The Hague (1925); London (1934); Lisbon (1958) and Stockholm 1967). For the text of the Stockholm Revision see International Legal Material (1967) pp806-826.
75. Among the Unions which WIPO administers are: The Paris Convention Union and the Bern Union for the Protection of Literary and Artistic Works. See the Convention Establishing the World Intellectual Property Organisation of July 14, 1967, in International Legal Material "ILM" Vol. 7 (1967) pp782-803. Articles 4 and 5.
76. Ibid, Art. 3. The WIPO Convention also includes provisions for a legal technical assistance programme to LDCs. Within such framework the member states established the "WIPO Permanent legal-Technical Programme for the Acquisition by Developing Countries of Technology Related to Industrial Property". See UNCTAD TD/B/AC.11/19 op. cit. p36.
77. The European Convention on the International Classification of Patents for Invention was signed in Paris on December 19, 1954 and came into force on August 1, 1955. TREATY SERIES No. 42 (1956) Cmd 9862. Its amended form of Annex, which entered into force on December 16, 1961, supersedes the version published in 1956. U.N.T.S. No. 12 (1963) Cmd 1956. While the Convention was open to all members of the Paris Union only Austria, Israel

and Spain have adhered to it. Of the original signatories Greece, Iceland and Luxembourg have not yet ratified the Convention.

78. Sections and subsections of the IPC:

- (a) Human Necessities: Subsections: Agriculture, Foodstuffs, Apparel, Medicine and Hygiene.
- (b) Performing Operations: Subsections: Separating and mixing; shaping, printing, transporting.
- (c) Chemistry and Metallurgy: Chemistry, Metallurgy.
- (d) Textiles and paper: Textiles; paper.
- (e) Fixed Constructions: Building, Mining.
- (f) Mechanics, lighting and heating: Engines, lighting and heating.
- (g) Physics: Instruments, Nucleonics.
- (h) Electricity: Electricity.

79. The Strasbourg Agreement has been signed by 33 states and will enter into force after ratification or accession by ten members of the Council of Europe Convention and three other countries including at least one at a defined level of patentability. After the entry into force the periodic updating and amendment of the IPC will be entrusted to a Committee of Experts of the member states. See UNCTAD TD/B/AC.11/19 op. cit. p37.

80. The United States Patent Office has started a series of bilateral exchanges of search results with Austria, Japan,

Switzerland, West Germany and other countries. See Address by Edward J. Brenner, US Commissioner of Patents, before the Patent, Trademark and Copyright Section of the American Bar Association, August 5, 1967, in 841 Official Gazette (1967) p674.

81. BIRPI, Introduction Report, PCT/1/2 (MAY 31, 1967).
82. The PCT was signed on June 19, 1970 by the representatives of the following countries: Algeria, Brazil, Canada, Denmark, Finland, Federal Republic of Germany. Holly see, Hungary, IRELAND, Israel, Italy, Japan, Norway, Philippines, Switzerland, United Arab Republic, United Kingdom, United States, Yugoslavia and Iran. WIPO Publication 274 (E) Geneva (1970); Reproduced in 9 International Legal Material (ILM) p978. (The 1968 Draft of the PCT appears in 7 ILM p981 (1968). Article 1(1) of the PCT.
83. The PCT has two principal aims: (1) to save effort - time, work, money, - for both national offices and the applicant in cases where patents are sought for the same invention in a number of countries, and (2) to increase the likelihood of issuing strong patents in countries not having all the facilities to carry a thorough search and examination. See BIRBI, Explanatory Memorandum 3 PCT/1/2(MAY, 1967); and PCT/111/4 (JULY 15, 1968) p5.

84. Articles 3-30 of the PCT, *supra*. note. 82.
85. *Ibid.* Article 31-42.
86. The earlier Draft of the PCT provides for a central filing to be directly filed within the International Bureau of WIPO (The WIPO Convention entered into force on April 26, 1970). Under the same Draft, national Patent Offices could require that the application is submitted through them in order to ensure the secrecy of inventions having an effect on the national defence. BIRPI, Patent Cooperation Treaty (Draft), PCT/1/4 (May 31, 1967). However, under Article 10 of the signed Treaty, no longer filing will be with the International Bureau but rather with the national patent Offices of the contracting states of which the applicant is resident. Equally, the earlier Draft gave the right to file to any national of the Paris Union but Article 9(1) of the PCT gives the right to file only to nationals or residents of the Contracting states. However, the Assembly of PCT may decide to allow residents from the Paris Union to file an international application (the PCT is open only to member states of the Paris Union Art. 62).
87. The receiving office would check that the application contains at least the following:
- "(a) an indication that it is intended as an international application;
 - (b) the designation of at least one Contracting State;

(c) the name of the applicant, as prescribed".

Article 11(1) (iii) of the PCT, see also Article 14.

88. It is possible that the Searching Authority and the Receiving Office could be one, if the latter was chosen as a Searching Authority. Articles 12 and 16(2).
89. Agreement signed at the Hague on June 6, 1947, Concerning the establishment of an International Patent Bureau (Institut International des Breuets). The Agreement was revised at the Hague on February 16, 1961, TREATY Series No. 15 Cmd 2672.
90. The PCT provides for both centralised search and for several Searching Authorities. This is because it is easier and cheaper to use the existing facilities than to boost those of the International Patent Institute. However the implicit reason behind allowing certain national patent Offices to be used as an International Searching Authority is possibly to accommodate the wishes of the highly inventive nations. Thus, it is probable that the national patent offices of US, Japan, Russia and West Germany will be used as regional Searching Authorities. See PCT/111/4 (July 15, 1968) supra note 83 pp6-7.
91. Article 15(1); (2), (3) and (4) of the PCT. The same Article [15(5) (a) (b) (c)] allows both the national patent office and the applicant, the former to subject any national patent

application filed with it to an international-type search and the latter to request such type of search, providing that the national Law of that Contracting State permits. The same provisions which apply to International Search would apply to the international search-type.

92. Article 18(2) of the PCT.

93. The international application is filed at the end of the 12th month (Article 8 of the PCT). It is transmitted to the Searching Authority and the International Bureau at the end of the 13th month. The search is carried out during the 14th, 15th and 16th months, but in time for search report to be sent to the applicant in the course of the 16th month. The applicant has two months to amend his claims, and two months more to prepare the required translations.. At the end of the 20th month he would have to furnish the translations and pay the national fees (Art. 29(3)).

94. Articles 31-42 of the PCT.

95. Ibid. Art. 31(2).

96. The International Patent Institute and probably the same four searching authorities would be used as examining authorities, Supra note 90.

97. Article 33 of the PCT.
98. Article 31(1).
99. Article 35(2).
100. See PCT (DRAFT)/1/4/MAY 31, 1967, op. cit.
101. Article 17 of the draft of PCT listed the grounds under which national patent Offices could deny the grant of a patent. No such enumeration was retained under the Treaty and it was left to those offices to deny the grant of patents on any reason. See PCT/111/3/JULY 15, 1968.
102. The applicant, having received the search report by the end of the 16th month, uses the 17th and 18th months not only to amend his claims but also to decide whether to demand international preliminary examination. He files his demand by the end of the 18th month and by the end of the 20th month the first written opinion should be issued. The applicant has two months (21st and 22nd) to reply to the opinion. The Preliminary Examining Authority issues the report one month later (23rd). The applicant has two months (24th and 25th) to prepare the required translations. Articles 39 and 40 of the PCT.
103. Without the PCT, an applicant starts to prepare his application for filing abroad at least 3 months before the expiration of

the priority right (translation of the applications and put them in different form for each country). Under the PCT, the applicant would only prepare a single application within the priority right which might be identical both in language and form to his own national application, or which may involve only one translation.

104. See Annexes 2:1 and 2:3.

105. UN Document E/4319 of March 7, 1967, p24.

106. The scarcity of technically trained manpower, adequate documentation and high cost of examination makes it more difficult for developing countries to introduce examination systems at the present time.

107. Search and preliminary examination would be affected by the International Searching and Preliminary Examining Authorities.

108. A special benefit would be derived by developing countries from the PCT, in the form of technical documentation; use of world's patent literature which are a by-product of the Treaty and makes access easier and cheaper to most of the patent literature than under the existing system.

109. The signator countries were Argentina, Bolivia, Paraguay, Peru and Uruguay, 37 American Journal of International Law,

Supp.155 (1943).

110. Ibid. Art. 1.

111. Convention for the Protection of Inventions, Patents, Designs and Industrial Models. August 20, 1910. TREATY SERIES No. 595.

112. Convention on Patents and Privileges of Invention, signed by Bolivia, Colombia, Ecuador, Peru and Venezuela at Caracas on July 18, 1911 and has been into force since.

113. In the first meeting of the Council's legislative and governing bodies in 1949, a committee of experts was established to determine the feasibility of a European patent office but because the diversity of patent Laws of member states the committee decided against such immediate establishment.

114. TREATY SERIES No. 43 (1955).

115. The Convention has been signed by 11 member states of the Council but has not entered into force because of the necessary ratification of 8 states of the Council.

116. The EPC was signed in Munich by 16 European States in 1973 and came into force on October 7, 1977. All EEC Member States were at the time signatories, and all except Denmark and Eire have

ratified the convention. See Written Question No. 567/79.
Official Journal of the Community (1977), C277, p24.

117. It has been possible to file a European Patent application since June 1, 1978. Written Question no. 246/78, O.J. 1978, C210 p10.
118. The Community Patent Convention, O.J. [26.1.1976] L.17, 15 ILM(1976) pp5-42.
119. Under Article 98 of the CPC, the entry into force is conditional upon the EPC first entering into force in respect of all EEC members. Thus, the refusal of Denmark and Eire to ratify the EPC automatically results in a de facto veto over the entry into force of the CPC.
120. Article 95 of the CPC.
121. Article 2 of the CPC.
122. HELGE. E. Grundman (1968) "Patent Laws in New AFRICAN STATES" Journal of Patent Office Society, Vol. L, No. 7 p494.
123. The signatories countries are: Cameroon, Central African Republic, Congo (Brazzoville), Ivory Coast, Dahomey, Gabon, Upper Volta, Malagasy Republic, Mauritania, Niger, Senegal, and Chad. Togo adhered to the Accord in June 1967. All the 13

states were under French rule prior to independence and none had established a patent office. The Accord came into force in 1964.

124. There is no common legislation applicable in all the member states but the same laws have their effect in the territory of each member state. The Uniform national laws included in the annexes are based to a great extent on French legislation. See UNCTAD TD/B/AC.11/19 op. cit. pp38-39. The Accord also provides for the grant of compulsory licenses and requires all the signing countries to join the Paris Union. The OAMPI would have preferred to institute an examination system but found it not feasible.

ANNEX 1:1

**THE INFLUENCE OF PATENT PROTECTION, ACCORDING TO THE SIZE OF COMPANIES,
IN THE FEDERAL REPUBLIC OF GERMANY**

Company Size Annual volume (in US \$ millions)	Number of patents examined	Discoveries, the company would have embarked upon without the patent protection (in percentage)	Discoveries the company would have not embarked upon without the patent protection (in percentage)
4 - 20	159	97%	3%
20 - 100	273	92%	8%
100 - 250	229	90%	10%
Over - 250	539	47%	53%

Source: IFO, from a paper entitled "Patent and license Policy", Institute for Economic Research, Munich, April 3, 1974, in ARTHUR GERSTENFELD (1977) "Innovation: A Study of Technological Policy", University Press of America, p61.

ANNEX 1:2

**TIME BETWEEN DISCOVERY AND FIRST ECONOMIC USE,
IN ACCORDANCE WITH THE SIZE OF COMPANIES**

Company size Annual Volume (in US \$ millions)	Number of patents examined	Time between discovery and first economic use according to the size of the company (in %)			
		up to 1 year	up to 2 years	up to 3 years	up to 4 years
4 - 20	159	40%	70%	78%	87%
20 - 100	273	32%	58%	66%	70%
100 - 250	229	26%	55%	65%	69%
Over - 250	539	15%	53%	43%	50%

SOURCE: IFO in Arthur Gerstenfeld op. cit. p62.

ANNEX 1:3

PATENTING AND NON-PATENTING IN CONJUNCTION WITH THE SIZE OF FIRMS
IN THREE UNITED KINGDOM BASED INDUSTRIES

NET ASSETS (in £ millions)	CHEMICAL INDUSTRY			ELECTRONICAL ENGINEERING AND ELECTRONICS			MACHINE TOOLS		
	Patenting	Non-patenting	TOTAL	Patenting	Non-patenting	TOTAL	Patenting	Non-patenting	TOTAL
< 1	1	2	3	4	2	6	2	3	5
1 - 2.5	2	1	3	4	0	4	7	4	11
2.5 - 5	5	1	6	4	1	5	8	3	11
5 - 7.5	1	1	2	1	0	1	3	2	5
7.5 - 10	0	0	0	1	0	1	2	0	2
10 - 25	1	0	1	3	1	4	4	1	5
25 - 50	3	0	3	2	0	2	0	0	0
> 50	3	0	3	3	0	3	0	0	0
TOTAL	16	5	21	22	4	26	26	13	39

SOURCE: D. J. SMITH, J. M. SAMUELS and J. TZOANNOIS (1972) "Patents; profitability, liquidity and firm size", Applied Economics pp77-86, table 1 p79.

ANNEX 1:4

DISTRIBUTION OF PUBLIC FINANCE BY OBJECTIVE IN FIVE OECD COUNTRIES
(in percentage)

COUNTRY	DEFENCE	SPACE	ENERGY	ECONOMIC DEVELOPMENT	COMMUNITY SERVICES	SCIENCE PLANATION	NON- SPECIFIED
UNITED STATES (1979)	48.5	13.4	11.8	5.4	17.1	3.8(1)	-
FRANCE (1979)	35.4	4.6	8.0	16.4	12.2	24.0	0.4
UNITED KINGDOM (1979/80)	55.3	2.3	6.6	8.3	6.3	20.1	1.1
JAPAN (1977)	5.0	12.1	20.4	41.7	17.2	3.6(1)	-
FEDERAL REPUBLIC OF GERMANY (1979)	11.6	3.9	13.5	13.3	14.7	43.0	-

SOURCE: OECD "Resources for Science" INFORMATION No. 5, Summer 1980.

(1) Does not include funds accorded to Universities by the State.

EXAMINATION OF PATENT APPLICATIONS IN WEST GERMANY BETWEEN 1970 - 1976

	1970	1972	1973	1974	1975	1976
Number of applications filed (approximately 50/50: German/Foreign)	66,132	65,354	67,354	66,223	63,545	60,095
Number of patents issued (after opposition - examination proceedings)	12,887	18,149	20,600	23,934	20,539	18,290
Number of patents examined (after request by applicant)	52,222	37,397	37,917	39,441	39,600	38,454
Number of applications published for opposition for examination)	21,235	14,780	21,226	25,226	26,825	21,856
Number of published applications which were opposed	2,253	3,939	4,806	5,413	4,855	4,109
Number of patents granted without opposition	8,183	16,066	18,587	22,307	18,949	16,473
Number of oppositions filed	3,200	5,990	6,837	7,574	7,017	6,237
Number of patents granted after opposition	2,191	2,009	1,999	1,697	1,925	2,330
Number of patents rejected after opposition	1,520	1,204	1,213	1,213	1,317	1,437
Number of applications pending no request for examination	224,534	212,265	217,881	222,829	222,626	221,858
Number of applications with request for examination	29,080	113,920	114,769	113,446	112,176	115,772
Number of patent disposed prior to publication (no fee paid, withdrawn, abandoned)	12,274	17,254	17,606	15,588	14,344	16,676
Number of patents disposed after publication not resulting in a patent (no fee paid, withdrawn, abandoned)	2,487	1,285	1,167	1,117	1,126	1,349
Request for search reports	6,880	7,141	7,608	7,740	6,801	6,748
1975 Invalidity Actions Before Federal Patent Court (BPG)	115 Cases pending at beginning of 1975. 100 New cases filed in 1975. 90 Decisions by court in 1975: 20 found invalidity; 20 partial invalidity; 18 discussed; 5 settlement by parties; 16 withdrawn; 4 other.					
Invalidity Cases decided by Federal Patent Court in 1975 and appealed Federal Supreme Court (BGH) (2nd instance review of patent decisions)	29 cases reviewed: 23 disposed without decision; 4 affirmed patent court; 2 reversed or modified patent court.					

Annex 1:5 (continued)

SOURCE: Patent Office Statistics - Federal Republic of Germany, as produced by BERNARD NASH (1977) "The Patent Reform Bill - The Pro Side". Research Management, May, p14.

1. Transition year of 1970, distorted figures when deferred examination system changed.
2. First 2/3 of 1975.
3. More than one for some opposed patents.
4. Beginning of each year.
5. Being examined or open for opposition, at the beginning of each year.

CHAPTER TWO

THE PATENT SYSTEM AND THE INTEREST OF THE DEVELOPING COUNTRIES

In the past two decades, economists, lawyers and politicians from both the industrialized and developing countries have been re-examining the influence and the impact of technology on the growth of the nations. Technology transfer and how such a transfer can be achieved best have become a familiar topic of research and public discussion, in which much have been said yet little has been done. Developing countries are being characterized by the inefficiency and the relative failure of technological efforts during the period following the second World War, as opposed to the technology gaining countries of the free market economies. They are also characterised by their massive dependence on foreign science and technology. The wide range of such dependence can be provided, for example, by the analysis of the quality and quantity of local scientific progress, the number of licenses and patents imported or exported by the developing countries. The extent of the use of turnkey contracts and foreign technical assistance are also indicative to technological dependence.

No one could argue with the aims of the developing countries to obtain economic self-sufficiency. These long term aims can only be achieved through the legal means which are currently being attacked in their present form. One of these legal means is the patent system which is described by the UNCTAD secretarial as follows:-

"The available evidence suggests that the international patent system is not in its present form proving to be of benefit to the developing countries and that it is instead having a negative effect on their economic development. [also] patent laws and practices of developing countries, following international standards have legalized an anomalous situation which had to come to act as a reverse system of preference to foregin patent holder in the market of the developing countries"[1].

However, technology transfer is not only patents, designs and technical data but more importantly the ability to put things together, to make them work, to maintain sufficient operations and uniform quality. It is the ability to receive, absorb and apply in a suitable manner the knowledge and techniques transferred from abroad which is accompanied by a requirement for teams of engineers and learned experts, themselves in contact with R & D activities.

Engineers and experts are the only qualified people capable of selecting what is convenient to local objectives. Moreover it is essential to adapt the imported technologies to local conditions. Developing countries should take into consideration the different levels of structure, the manpower problem and management as well as the local physical conditions. Since even if the problem of access to foreign markets of technology (patents, know-how, licenses etc) were to be drastically changed in favour of the receiving countries, this would probably not be an easy way to technological transformation[2].

The problem of the transfer of technology should no longer be conceived as acquiring the mere physical transfer of equipments, products or the conception of the technology as a product rather than a process. Technology is not a world of products but one of information, the ability to produce own information and to employ it in socially useful activities[3]. To have own capability to produce information from scientific research is a necessity, as we have seen in Chapter One. It occupies an essential place nowadays in the process of technology production in the industrialised countries. The organization and the promotion of research and development constitute an indispensable condition to the mastery of techniques in the developing countries which are condemned, up to the present time, to contemplate economic and industrial breakthrough solely based on inventions and processes developed elsewhere[4]. The actual scientific potential of the developing countries in relation to their needs is completely marginal, more over such phenomenon tend to aggravate continuously under the influence of different factors[5]. In fact, the whole of scientific research activities of developing countries do not produce the new scientific and technical information necessary for the production and transformation of those societies[6].

A country can not be considered industrialized unless in addition to the factories, it has developed a research capacity for the purpose of innovation. Without such capacity and without the importation of foreign technology, factories would cease to be a decisive factor in the economy of that country. As developing countries do not yet

possess the capacity to produce own technology, they are forced to rely on the importation of such technology from the industrialized nations mostly those of the free market economies where inventions are perceived as the core of technology and thus legally protected by patent legislation. The transfer of such technology signifies the passing of technological innovation to developing countries. This passing has the effect of putting them in possession of industrial knowledge obtained in the industrialized countries. In principle such knowledge cannot be ceded without financial return. However, the process of technology transfer would have been easier if all depended on the written or codified technology, since what is patentable is only the visible part of it.

It is not an easy task to put limitations on the field of international technology transfer. There appears to be a delimitation problem of what can or cannot be considered as transfer of technology. Should the term include all the international technological factors such as patents, trademarks, design, written information related to the setting up of equipments, technical assistance, the control and operating methods of machines and the commerce in equation which materialize the production techniques of other goods and the training of personnel? Or should the reverse be preferred? A precise delimitation of the transfer of technology "TOT", in other words to reserve the term "TOT" to explicitly one onerous transmission of specific knowledge operations in which TOT is treated as commercial operation[7]. The first approach is the one to be retained in this chapter with the main emphasis being the patent system.

The transfer of technology is widely carried out under the form of licensing agreements for those developing countries who possess a substantial industrial basis such as India and some Latin American countries and under the form of equipment and machines acquisition which are essential since they allow the fabrication of products from the codified technology originally held by firms in the industrialized nations. The latter form is mainly used in those developing countries with no domestic or little industrial basis.

To evaluate the role of the patent system, or the lack of it on the transfer of technology to the developing countries, this chapter will be divided into three parts:

First: The characteristics and cost of the patent system to the developing countries.

Second: The changes in national patent legislation and their impact.

Third: Grounds for the revision of the Paris Convention.

1. Characteristics and cost of the patent system in its present form to the developing countries.

To assess the economic significance and implication of the patent system as a means which might influence technology transfer^[8], one has to assess the social cost and benefit of the system. As well as this one needs to take into account the underlying rationale which justifies the system in the developing countries. As far as the developing countries are concerned, the rationale of the system appears to be that the patent protection acts as an inducement or a stimulus

for technology transfer or that the transfer depends on the availability of the patent protection. This assumption does not go unchallenged since, for the patent system to act as a stimulus to TCT, developing countries would have to have a share of world patents in order to benefit from the exchange of knowledge[9]. Even if the above assumption was considered to be true, to work it, the cooperation of patent holders in providing the necessary know-how which the receiving developing countries do not possess, or such know-how can not be obtained elsewhere. To gain the patentee's cooperation, patent protection must be extended to him[10].

The evaluation of the developing countries patent systems can be seen through the characteristics of these systems and their impact on the economies of these countries:

A. Foreign ownership of patents as compared to local ownership:

As Vritsos rightly put it "when one talks about patents in developing countries one really means patents owned almost in their totality by foreign companies or foreign nationals"[11]. Annex 2:1 illustrates the extent of such foreign dominance. The degree of patent ownership by non-residents in each of the selected developing countries indicate that, unlike the developed countries, the existence of the patent system in the developing does not depend on the domestic inventions[11a]. It might be in the best interest of a country's economy to grant more patents to foreigners, providing that the granting country is almost at an equal technological level with the

most inventive nations. Obviously, this suggestion does not qualify for the developing countries since their present level of technological capacity is very low in comparison with the industrialized nations. Equally, the suggestion is based on reciprocity qualification. Thus such suggestion is irrelevant as far as the developing countries are concerned[12].

Among the patents registered by foreigners in developing countries the majority correspond to patents originating in six industrialized countries[13]. Annex 2:2 shows the evolution of foreign patenting registered in Algeria from 1966 to 1978.

Although Annex 2:2 shows that only 5170[14] patents were registered by foreigners from 1966 to 1978, the actual number of patents held by the Institut Algerien de Normalization et de Propriete Industrielle "INAPI" is well above 3 million. It is claimed by the INAPI that the majority of these patent documents were received free of charge from nine countries[15]. It should be noted that the majority of these patents have expired in 1980. However, the holding of such a number of patents, no matter how recent it was, or whether it was obtained at no cost, is irrelevant to the industrialization of Algeria because, (i) most patents require additional know-how to be worked and which Algeria has not acquired yet, (ii) the absence of an adequate structure meant that these documents are not available to the public[16], and (iii) even if there was an adequate structure, the availability to the public would not have benefited much Algeria, due to the lack of qualified people who might be able to obtain useful

information from those patent documents. Thus, the free depositing of patent documents in Algeria is a misleading issue which may be designed to obtain the goodwill of Algeria. It is like A allowing B to have the use of his car in the next 3 months while he knows that B will be spending the next six months in hospital, he is also aware that B cannot drive if he comes out during the first 3 months. This is a clear indication of the non-significance of patents in themselves in the transfer process. To my mind what matters really is not the high percentage of foreign patenting in developing countries but rather the low participation and the lack of adequate resources devoted to increase local inventive activities. The high proportion of foreign patenting can be controlled, as we shall see later, or at least reduced in the case of the few developing countries who brought new changes into their patent laws.

The significance of the fact that the majority of foreign patenting in developing countries is being held by six industrialized countries is that techniques utilized in the developing countries economies carry certain number of characteristics determined by technological orientation of the industrialized countries[17]. The transfer of these techniques necessarily lead to the question of their maladjustment to the receiving environment. Two types of maladjustment or non-adaptation may result from such transfer of techniques. Firstly, the maladjustment of imported production techniques presents three aspects: the inadequacy of the available local resources particularly manpower, exceeding installed capacity to the size of the market and weak diffusion of productivity gains at the

industrial structure level[18]. Secondly, the non-adaptation of consumption goods to the demand and to the productivity structure[19]. This means, even if the technology embodied in those patents was available at a reasonable cost, patents are unlikely to have a beneficial effect on the economies of the developing countries. This is because patents (the majority of them) - tend to enforce the monopoly in the use of advanced technology which is enjoyed by those inventive industrialised countries.

To realize how serious the domination of foreign patenting in developing countries is, one has to look at their participation in the operation of the patent system worldwide. Annex 2:3 for instance shows that the annual application in the three selected economic groups in 1969 was 391554 applications. The share of the developing countries was only 5992 applications of which 76 per cent were filed by non-nationals, or the participation by the selected 21 countries in that year was only 1438 applications. The situation has not changed much. In fact out of the 425024 applications filed in 1978 in the three groups, applications filed in the 21 developing countries were 9527 taking out 85 per cent from this figure which was applied for by non-nationals we find that only 1429 applications were filed by the nationals of these 21 countries. It can be estimated that the developing countries as a group, accounted for 1.8% of the patent application in the three groups which is 75866 applications out of 4,195,773 applications. Of these only less than 0.5 per cent or 20257 applications were filed by nationals of the selected 21 countries[20].

B: Corporate ownership of patents:

The shift of patents ownership from individuals to corporates was a direct result of the decline of the individual inventor's role as a source of invention which is in return, a result of the increasing cost of research and development activities. These increasing costs, as well as the complexities of research which often requires a group of researchers to deal with them, are in financial and practical terms beyond the means of the lone inventor[21]. Since patents are the result of R & D, their use[22] have become different; "Today the great mass of grants are taken out by technicians working in the laboratories of large cooperations.... it removes the patent from the inventor's to the executives world. Its use is then no longer attained to the folkways of science but to those of business[23].

The obvious result of the shift was the concentration of patents in the hands of a few large corporates. Both the present international patent system as well as governments in the industrialized countries contributed to such a concentration. The former contributed to this by allowing for equal treatment and the taking out of many patents. In theory this is available to any patentee whether it may be an individual; or a corporate. However, in practice it implies that only those firms with worldwide production could maintain patents in foreign countries. The latter contribution came in the form of public funding of R & D activities through the state. It is estimated by Watson and Holman that 50 per cent of all the patents acquired by private contractors as a result of public funding of R & D in US between 1946-1962 are owned by large

cooperations[24]. The degree of patent ownership by firms as compared to individuals in developing countries may be higher than in the industrialized countries because of the high proportion of foreign ownership of patents in the developing countries.

C: The Non Working of Patents:

If one assumes that foreign patenting in developing countries are of importance to the process of technology transfer, than the number of patents exploited in these countries will at least indicate the theoretical possibilities for such a transfer. The quantitative evidence that is available shows the extent to which patents are not being worked in developing countries is roughly between 90 and 95 percent[25]. For example, out of 8603 patents registered in Mexico[26] only 1951 were worked, representing only 22.6% of the total. An official report of the Indian Government concluded that:

".... Those patents are therefore taken not in the interests of the economy of the country granting the patent, or with a view to manufacture them, but with the main objective of protecting an export market from competition from manufacturers, particularly those in other parts of the world"[27].

Why then firms take patents in developing countries and suppress them? A survey of 69 companies holding patents in 17 African countries[28] up to 1968 by Grundmann shows the motivations advanced by the 34 companies which answered the questionnaire in order of importance:

- 24 companies gave "importation" into the country as one or the sole motivation for taking out patents in these countries and to be protected from imitators imports.

- 23 companies gave "defence" as one or the sole motivation to prevent others from obtaining patents in those 17 countries, in other words to protect their export market.
- 21 companies advanced "licensing" for the production in these countries. This may be more applicable to Algeria where import is the monopoly of the state, and direct foreign investment is not welcomed except in few industries such as oil and chemicals joint venture with 51% minimum capital participation by the state. [Service companies].
- 19 companies advanced "production" in these countries as the ground for patenting in these countries.

The questionnaire reveals that a substantial number of patents taken out by the 34 companies in the 17 African countries are not intended to be exploited or to transfer the patented technology - (importation). Furthermore, they are defensive patents which imply the intention to forestall the transfer of a particular patented technology. However, even if there is an intention of licensing and producing in these countries, which if applied could lead to the transfer of technology, one must not forget that intention in itself does not lead to the actual transfer[29].

The developing countries believe that the local manufacturing of patented products or patented processes can neither be substituted by the importation into the country, nor by the non-working of patents[30]. The working of a patent in the granting country

carries with it the use of local raw material and more importantly, employment resulting in the much needed training of the local workers. Equally, the removal of import monopoly from the exclusive right of the patentee may create competition, and thus enable developing countries to obtain goods at a comparatively cheaper price. However, the cost imposed through the patent import monopoly can only exist if the price paid for products is higher than it would be in the absence of the exclusion of import monopoly or the absence of patents altogether[31].

It has been argued that if patents were to be worked in the developing countries instead of importation into these countries, the concerned goods will become more costly to produce. Despite the cheap labour, it is often more expensive to produce in the developing countries. This may be because of the small size of their markets. In most cases one or two plants operating under favourable conditions are sufficient to supply the whole world with a particular product[32]. If the above situation is the case, then what is the justification for the patent holders to take patents in developing countries since the recourse to the products of these plant's will be automatic. The only function then of such patents is to stop the development of a similar or a substitute technology in these developing countries where the concerned patents are taken out[33].

It is also suggested by those who do not adhere to the ideas of local production of patented inventions, that the reduction of the patentee's right, either by compulsory licensing, revocation or

removal of the right to import would lead to a reduction in R & D activities and that the existence of strong patent protection can induce a company to engage in R & D and market inventions[34]. In other words, the above suggestion can be read as follows: developing countries should provide patent protection to companies in order that the latter can carry on with their R & D efforts and to obtain more benefits.

Data concerning the number of non-worked patents in developing countries may over-rate the costs of unused patents, since such patents can only be a ground for social cost if their local production could be proved economically beneficial and was prevented by the patent holder. There is no additional cost to the economy if local production is neither economical nor it can be undertaken by other companies[35]. For example, in Argentina out of the 102 patents held by multinationals, 58 patents were not worked at all, 15 were worked and the rest 29 patents were used to protect imports[36].

D: The Cost of the Patent System:

Having shown that the majority of patents taken out in developing countries belong to non-nationals most of which are used for purposes other than local production, we can now go onto consider the main costs resulting from such unused patents. These costs arise from the blocking of local development of similar or substitute technologies and also from the importation of the unexploited patented products in the absence of restricted competition due to the patent monopoly, which may lead to overpricing. It is only the small number of patents, worked in the granting countries, which can represent a real

transfer of technology. Even for such a small proportion, the cost is quite high and include the following:-

(i) Royalty costs which are associated with monopoly power. The economic consequences of these royalty payments can be seen in the form of a direct foreign exchange to previous transfers to the developing countries in 1968. According to Patel, this was estimated at 1.5 billion dollars, equaling 5 per cent of developing countries exports - (excluding oil) - or about 40 per cent of their debt servicing obligations. Because of rapid growth, these costs are projected to be about 9 billion by 1980[37].

(ii) The transfer of technology is grounded on business motives, usually to locations where sufficiency in production exists and where transportation is more available. The transfer takes place under imperfect conditions due to the domination by the multi-nationals and because of the fact that the technology cannot be sold on its own. The consequence of the imperfectness of the technology market means that the receiving enterprise from the developing countries or the subsidiaries working in these countries are not free to use the acquired technology for export. Thus, the consequences of this denial of opportunity to export is a loss of foreign exchange earning and higher costs of production due to the artificial limitation placed upon the developing countries. Annex 2:4 illustrates the extent to which restrictive practices relate to export and others are employed in technology agreement in India and the Phillippines. The Annex

shows that prior to March 1964, 43.3 per cent of the approved agreements in India included explicitly one type or another of export restriction. Despite the decrease in approved agreements - less than 40% of that of 1964 - the percentage increased to 47.1 in March 1969. In the Phillippines it was 32.1 per cent of the total number of agreements which contained explicit restriction of export[38]. However, the abolition of export restrictions does not lead to an automatic export in every case, but nonetheless it is a necessary condition if full export capability was to be realised by developing countries. The abolition of the restriction may also help to reduce the monopoly power of the licensor, particularly where patents are concerned, as markets where he holds no patent protection will be open to him and his licensees more competitive grounds.

(iii) Much of the licensing is being done on an exclusive basis, which means that only one firm in the receiving country can actually use the licensed technology. This leads to a limited competition which is used by the licensor to charge higher prices than he would have been able to if there were no competitors.

(iv) Other costs are also associated with the wide variety of restrictions. Annex 2:4 shows that prior to March 1969 of all the approved Indian agreements 12% included explicit tie-in clauses. For the Phillippines this figure is shown at 26%. However, the impact of restrictive practices on patent costs is not easy to assess since licensing agreements involve other tangible and intellectual property as Annex 2:5 shows. There is rarely a case where patents existed alone, in most cases existing in combination with the sale of know-how or trade marks[39].

According to the figures shown in Annex 2:5, concerning licensing agreements it seems that non-patented technology - (know how) - play a more significant role than the patented one. This is achieved by comparing the total of assests transferred involving patents to the total of transferred assets involving non-patented technology^[40]. except in Algeria^[41], the balance between the two assets in India, Latin America, and the Phillippines is in favour of the non-patented technology.

The co-existence of patented and non-patented technology in licensing agreements and the high percentage of non-patented assets suggests the tying of the two assets by the licensor. The high percentage of non-patented assets may suggest that patents are tied to know-how. In such a case patents have no significance in the transfer process. As the packaging of patents with know-how means that the former cannot be sold on its own value. Even when the situation is reversed, it indicates no better signs since the tying of know-how to patents can only mean the lack of supply sources available to developing countries. Equally, it shows the lack of sufficient knowledge in the recipient developing countries. The significance of patents in the transfer of technology process appears to be positively associated with the level of economic achievement, demonstrated by the high percentage of patents in the transfered assets by the American firms to other firms in industrialized countries.

To summarize, it appears that most developing countries in Africa, Asia and Latin America have been granting monopoly power to foreigners, mainly big firms, through their own patent legislation.

Foreign ownership signifies the non-importance of patents as an incentive to domestic inventive activities in the developing countries. The non-working of these foreign owned patents indicates that the main function of patents in the developing countries is to protect the import of the foreign companies into the developing country against imitators. Such patents forestall possible imports or local production by imitators and more importantly cancel or delay the development of similar or substitute technology by local enterprises. In this way, the function of patents appears to be the maximization of profits by foreign firms and thus patents are an incentive to inventive activities, not to the granting countries but to those firms who use it to dominate markets or expand them.

Even when patents are licensed to developing countries they have a different function from that of the part they play in the industrialized countries. When patents are licensed to developing countries, they generate a set of tied purchase from the licensor (i.e. know-how, intermediate goods, capital goods and the supply of capital) - allowing a higher return to the licensor and more burden on the purchaser of the technology.

There is now a greater awareness among the developing countries that the present system and the principles embodied in it are inflicting a heavy burden upon them in relation to their technological development in general. At the same time and for practical reasons they recognise that the system has to stay but not in its present form. No single country can take such a dramatic action as to abolish

the system. Furthermore, it seems most unlikely that all the developing countries would agree to the abolition of patents. In my own view, the question facing developing countries is not whether or not to have the system, but how to reform the system and make it work in their favour.

2. THE CHANGES IN NATIONAL PATENT LAWS AND THEIR IMPACT

The Changes:

Patents and other industrial property have so far failed to contribute either to encourage rapid transfer, appropriate adaption through assimilation and widespread diffusion of imported technology, or to stimulate local inventive activities among nationals of the developing countries. The only way developing countries can benefit from patents is to put the technical knowledge embodied in patents into an effective use through their local production facilities. To do that, national patent legislations have to be properly designed in order to contribute to the creation of a favourable environment where the heavy economic and social responsibilities of the state in developing countries must be balanced with the rights of individual patentee's and corporation. In other words, national legislation should find a balance between the public interest and the monopoly rights of the patent holder. Thus, patents should be conceived as an instrument of national economic policy to be used in conjunction with other policies to achieve the desired national objectives and to govern the legal monopoly by the criteria of public interest and national sovereignty. The function of patents should be the promotion

of scientific and technical capabilities in developing countries, to generate and diffuse technical knowledge, to incorporate such knowledge into production process and to facilitate the access to foreign technology markets under fair and reasonable terms.

Most developing countries have patent laws varying in their form according to the country^[42]. Several, such as India and Mexico have very modern and elaborate systems. During the 1970's decade, major changes were introduced into the national patent legislation of certain developing countries. These changes excluded certain products and processes from patentability on the grounds of public interest and the need to accelerate national economic development. They also concern the working of patents locally and the exclusion of the right to import by the patentee as a means of working. The discussion of these undertaken changes will be concentrated mainly on the Andean Pact countries, Argentina, India and Mexico.

A. PATENTABILITY:

An essential requirement in most patent laws is that the invention sought to be patented must contain an "inventive step". Such a requirement ensures that the patent monopoly can only be granted to the inventions which contribute, in a genuine manner, to the public stock of knowledge. For example, Decision 85 (Art 1) of the Andean Pact prescribes that the subject matter must be capable of being manufactured or used in any kind of industry:

"An invention patent shall be granted for new creations capable of industrial application and for those which may complement such creation"^[43].

Not all inventions are of value to the developing countries, thus a certain number of products and processes have been excluded from patent protection basically through their exclusion from patentability[44]. Colombia first changed its patent law in 1971 then in 1978 incorporated Decision 85 of the Andean Pact to exclude, food; drugs and beverages from patent protection[45]. However, the manufacturing process of the products are allowed as long as the applicant can prove within a year that the process used locally to supply the market is based on reasonable terms as well as quality, quantity and prices.

B: THE SCOPE OF THE PATENTEE'S PRIVILEGES

The privileges conferred to the patentee vary from one country to another. However, traditionally patents confer the privilege to manufacture, utilize, to distribute in the course of trade the product or process covered by the patent[46]. The extent of the privileges and their applications in the developing countries where there is a lack of appropriate measures relating to the exploitation of inventions, led to abuses of these rights, mainly the use of importation as a substitute to the working of patents locally in the granting countries. To combat such abuses, the right to import was excluded by some of the developing countries from the conferred privileges to the patentee.

Based on Article 28 of Decision 85, Peru, Ecuador and Colombia, the right to import was excluded from the exclusive rights conferred to the patentee[47]. The same exclusion was included in the Mexican law of 1975 Art. 37(2):

"The patent shall not confer the right to import the patented product or a product manufactured by means of the patented process".

In practice, the possible effects of excluding import monopoly from the patentee rights means that he can not prevent third party from importing into the country the patented product but can prevent the local production of the patented product. Thus, the function of patents is seen as an industrial instrument, at the same time limits the function of patents as private instrument for the regulation of trade[48]. However, the exclusion or reduction of import monopoly is a desired measure in the case of the developing countries, since it may prevent the patent holder from obtaining legally, monopolistic rents by being the sole importer and thus could charge higher prices of imported products. Nonetheless and despite that the scope of the exclusive rights belongs to the concerned national law, the exclusion of import monopoly conflict with Article 5 Quarter of the Paris Convention, which was incorporated in the Lisbon Act of 1958. Such conflict arises when the national law extends the protection of the process to the product manufactured by such process, "Product by process protection"[49].

Patent legislation reforms also included measures relating to the non-voluntary licensing of patents. In this context, the exclusive rights of the patentee to use his invention locally are granted only for five years providing that he exploits the patent. Such rights for the exploited patents, continue for five years more subject to non-exclusive compulsory licenses[50]. Thus the exclusive right to use in the second five years does not belong to the patentee, but is

shared with any interested person who may ask for an authorization to use from the competent authority subject to paying royalty[51]. Governments of the Andean Pact may also at anytime grant compulsory licenses if public health and national development require so[52].

The Colombian Decree 410 of 1971, prior to the incorporation of Decision 85 provided for non-voluntary licenses in cases where the patent was relevant to public health or the need of economic development. Such a patent could be subjected to "licence of authority"[53] "license of rights" are also granted under the Algerian Patent Law, but unlike other patent laws it is left up to the patentee to apply for the mention of "license of right", "license de plein droit" to be entered into the register in respect to his patent at any time to the competent authority. Any person shall be entitled to obtain a license to exploit such a patent upon terms which shall be fixed by the court in the absence of an agreement between the parties. If no license was granted, or all the licensees agree thereto, the patent owner may at any time apply for the cancellation of such entry[54]. This provisions appears to be designed to attract foreign individual patent holders to benefit from their patents through the application for "license of right". Since the mere patenting in Algeria would not necessarily entitle the patentee the right to exploit it in the country as most of the industrial sectors are state owned, moreover imports and exports are the monopoly of the state. It would be more beneficial to Algeria to change such a provision and to give the state the right to grant non-voluntary licenses which would cover those sectors where foreign private investment is allowed. To leave it as it is, the provision would have

no impact on foreign patent holders as direct licensing would possibly be more beneficial to them (i.e. more tie-in purchase).

C: THE WORKING OF PATENTS:

As we have seen earlier the problem of non-working of patents is an international matter as far as the developing countries are concerned. Since the majority are owned by non-nationals, this means without their co-operation the developing countries will find it difficult to work patents even with such measures as compulsory licensing and other provisions. Thus, the developing countries are attempting to find the right legal approach to render patents exploited locally; such trend is underlined by India Patent law of 1970 (Article 83):

"Patents are granted to encourage inventions and to secure that the inventions are worked in India on a commercial scale and to the fullest extent that is reasonably practicable without undue delay, and that are not granted merely to enable patentees to enjoy a monopoly for the importation of patented article".

The general trends in the reforms of patents with relation to the working of patent through legal forms, included the following:

FIRST: The duration of patent life: as noted earlier, Decision 85 provided for five years, which can be extended to another five years as long as the patent is adequately worked[55]. Even before Decision 85 Colombia granted patents for 8 years with an extension of 4 years if the patentee can prove that the invention was being exploited[56] and in Peru the term was 10 years[57].

SECOND: Definition of exploitation: specific definition of exploitation is included in the Mexican Law of 1975. "... Exploitation shall be the permanent use of the patented process or the manufacture of the product covered by the patent, either directly by the patentee or by his successors in title or licenses, in quantities that amount to effective industrial exploitation on a satisfactory conditions as the quality and the price"[58]. The inclusion of the words "permanent" and "stable"[59] automatically excludes interruption as a means of exploitation. Equally, the exploitation of the patented invention must satisfy the local market reasonably[60].

THIRD: Exploitation and Imports: Recognition in the new patent laws of the fact that importation should not be taken as to constitute working of patents. As well as the above definitions of exploitation, the Mexican Patent law (1975) explicitly excluded importation: "Importation of a product covered by the patent or of a product manufactured by means of the patented process shall not be deemed exploitation"[61].

FOURTH: Exemption grounds: One of the key elements in determining the effectiveness of legal measures directed against the non-working of patents are the legal grounds exempting the patentee from his obligation to work the patent locally. Under Article 5A of the Paris Convention, the patentee may justify the non-working of patents by "legitimate reasons". However, the term "legitimate reasons" is a very wide term and cover all sorts of excuses from technical to economic justification. The concept curtails the freedom of national

authorities to lend its own interpretation to its application, the term could be replaced with a more adequate term such as "force majeure", to protect the public interest of the developing countries as well as to simplify the task of national authorities or courts concerned with grant of compulsory licenses.

"Force majeure" is admitted as the only justification for the non-working of patents under both the Argentinian and Brazilian Patent laws[62]. Decision 85 Art. 35, left the question of legitimate reasons to the competent national authority of the member states[63]. The Algerian Patent Law excluded importation from being a legitimate reason for non-working patents[64].

FIFTH: Measures against the non-working of patents: Compulsory licensing is the primary remedy in most patent laws. Under the Algerian Patent Law (Art. 44), any interested person can apply after three years following the grant or four years from the application date whichever is longer for a compulsory license if one or more of the following conditions are met:

- (a) The patented invention capable of being worked within the country has not been worked, applied or used by an establishment existing within the country and not on a scale which is appropriate and reasonable in the circumstances.
- (b) The demand for the patented product is not met to a reasonable extent within the country.
- (c) The working of the invention in the country is prevented or hindered by the import of the patented article.
- (d) The owner of the patent refuses to grant licenses on reasonable terms.

(e) A substantial export market for the patented article which is manufactured within the country is not supplied.

(f) The establishment or development of industrial or commercial activities in the country are unfairly prejudiced.

It should be noted that the inclusion of the word "capable" in (a) above, means that compulsory licensing may not apply to those patented inventions in certain industrial sectors which are the monopoly of the state. Compulsory licenses are also granted in the cases where a protected invention in Algeria cannot be worked without infringing the rights attached to an earlier patent with conditions that the latter invention represents a notable technical progress in relation to the former or that the final industrial use is different[65].

THE IMPACT OF THE CHANGES:

1. Foreign patenting: A decline in patent applications can at least be expected in those countries concerned with the changes, as the new exclusions from patentability and higher standards would in theory leave out inventions which would have been qualified without the changes. Foreign applications would, according to the changes, be more affected as most of these changes are directed towards foreigners, whether explicitly by the stringent conditions on the working of patents and the exclusion of import monopoly, or implicitly due to the fact that the majority of patents are owned by foreigners. Equally, the reduction of the life of patents could lead to a decline in patenting both domestic and foreign.

As we have seen in Annex 2:3, the share of industrialized countries during the period 1969-1978 was 3,960,265 applications or 94% filed in these countries, which heavily influence total world patenting. We also saw in the same annex that the share of the selected developing countries continued to increase and carrying with it another increase which concern the share of non-nationals to reach 85% of the applications filed in these countries in 1978. In contrast, both in the socialist group and in the industrialized countries there was a decrease in the share of non-resident application.

A different trend in patent application can be noticed in Mexico, India, Colombia and Argentina with a decrease of 45%, 46%, 67% and 39% respectively compared to a 59% increase in the selected 21 countries [compare Annex 2:3 and 2:6]. In Algeria patent applications continued to increase[66]. At the same time foreign application decreased by 48% in Argentina; 66% in Colombia; 57% in India and 49% in Mexico, while there was an increase of 78% in the 21 selected developing countries. However, the drop in foreign patent applications was far more pronounced than in domestic patent applications, suggesting that the changes may have affected and discouraged foreign applicants more than the nationals (i.e. import monopoly).

The changes in patent legislation appears to have played a role in reducing patent application particularly by foreigners. However, it seems to have not affected or hindered the flow of technology to the concerned countries. A UNCTAD study shows that neither the flow of technology through contractual agreements did fall during the same

period in both Argentina and India for which information is available[67], nor that direct foreign investment was affected in either of two countries as Annex 2:7 illustrates.

2. The Working of Patents:

Despite the expanded grounds for granting non-voluntary licenses, only 8 compulsory licenses were reported in India between 1973 and 1977, suggesting the non-effectiveness of such measure as a remedy to non working of patents in the developing countries[68]. According to another UNCTAD study the Indian Patent Law of 1970 might have led to a higher degree of working than before the reform, although there is no statistics on the working of patents neither before nor after the 1970's changes. Although the study suggests that there was an increase in the patent application's share of the Indian nationals, the rejection was higher for national applications than that for foreign applications (50% of domestic application compared to 7% of foreign applications). Equally, the increase of patenting of enterprises and institutions from 41% in 1967 to 63% in 1976-79, assuming that enterprises and institutions are more likely to work inventions than individuals. On the other hand, the stringent working obligations and the exclusion of importation as a means of exploitation are likely to discourage foreign firms patenting particularly those who neither intended to work the patents nor to license them[69].

To summarize, during the last decade major changes were gradually introduced in the national legislation of some developing rather than to wait until a mutual agreement is reached through the revision of the Paris Convention. The most desired changes concern higher patentability standards, the reduction of import monopoly and patents duration as well as a wider scope of exclusion from patentability. The reform was also concerned with the working of patents in the granting countries such as the definition of exploitation, the exclusion of importation explicitly as a means of working patents, the limitation of the exemption grounds for the non-working of patents and the application of revocation, as a remedy when compulsory licensing fails to be effective.

Despite the effect on patents application, particularly foreign ones in the concerned countries, it is early yet to know the full impact of these changes. Nor that it can be said for sure, that the decline was a direct result of the changes. However, when the limited information available is compared, it suggests that they may have influenced such a decline.

3. Grounds for the Revision of THE PARIS CONVENTION

Most of the argument about the need for a change or reform of industrial property system has been concentrated on the revision of the Paris Convention. The Convention binds its members to give to all nationals of the member countries.

(a) the same treatment accorded to their own nationals; (b) a priority

period of one year to the applicant in one country for filing his applications in all the member countries without being exposed to objections based on prior publication or use, (c) the independence of a patent in time and validity from patents granted in other countries, particularly where the application was first filed. In the light of the New International Economic Order, the present revision of the Convention is required to adopt to the needs of the developing countries[70].

The Paris Convention has already been revised six times[71]. However, the developing countries have played no important role in these revisions and the results of the previous revision were designed to strengthen the patent holders position. The present Convention is not considered by the developing countries as representing an equitable balance between the rights of the patent holder and the public interest of the granting country. Developing countries are hoping to obtain the reform through mutual agreements instead of introducing these changes themselves gradually in their national laws. I am of the view which favours the latter process to the former. However, this is not to say that the international process is not desirable but that it is a lengthy process and one that may prove to be costly for the economies of the developing countries.[72]

The present dependence of the developing countries on the industrialized countries is fundamentally technological in nature. The majority of the developing countries are substantial importers without corresponding exports (except raw material), therefore are used as granting market power to foreign patent holders - (import

monopoly of patented products and products protected by a patented process) - So the principle of non-discrimination initiated by the rule of free trade cannot be relevant to industrial property, as Vaitsos put it "Equal treatment of unequals is a questionable principle"[73]. The legal equality, which is the corner-stone of the Paris Convention is spurious since the developing countries are not at present equal to the developed countries. In a world of extreme inequalities between developed and developing countries, the enactment of discriminatory rules at the national level may be justified. The major provisions which developing countries are seeking to get a mutual agreement on their reform, are those concerning:-

FIRST: the national treatment principle: The application of the national treatment and international standards embodied in Article 2(1) of the Paris Convention[74], by developing countries raises several issues. Since developing countries are economically poor and scientifically far behind the developed countries, the application of the principle does not make sense as the parties involved are not equal. Under the present circumstances, the application of the principle simply gives the stronger party - developed countries - unlimited freedom to exploit the weaker party - the developing countries -. An alternative strategy suggested by E. T. Penrose and based on the shift from the patent owner to the patent status:

"As such, foreigners and nationals would be accorded the same treatment, thus avoiding question of discrimination according to nationality. Yet patents covering know-how which was developed locally (by foreigners and nationals

alike) could be treated differently from patents covering technological advances realized in the rest of the world" (75).

This proposed alternative, bases the treatment not on the origin of the inventor as in the Paris Convention, but on the geographical origin of the invention. Under the convention, the principle of national treatment was based on the assumption that there would be a reciprocity and mutual benefits in the form of an exchange of patents and licenses between members of the Union. However, as the level of industrialization and technological capabilities as well as the inventive abilities is different among the member countries, equality is not guaranteed. The result is that developing countries found themselves protecting inventions developed elsewhere and without having anything protected for them in the other member countries. As it was mentioned in Chapter 1, the national treatment principle in most cases, even in the industrialized countries benefits only the multinational corporations. It cannot be seen (as it stands) as a means of inducing local inventiveness and initiatives in the developing countries.

SECOND: Importation of patented goods and the working of compulsory licenses. In general the protection of an invention depends on the patented invention being worked locally either by the patentee himself or his licensee. The economic rationalization of compulsory licensing is the need to encourage domestic exploitation of patents held by foreigners, and more importantly to avoid the

importation of the patented products or products produced by means of the patented process. Such importation render the patent protection to a "license to import". It is specified in Article 5(A) of the Paris Convention that the importation of the patented products into the granting country shall not be a ground for forfeiture of the patent, suggesting that the monopoly to import can prevail, even when the patent is not worked locally.

The period needed to apply for a compulsory license (Art 5 A(4)) can be delayed due to the presence of legitimate reasons and the judicial process which are likely to reduce the value of compulsory licensing. Another delay can be created if the patent holder is multinational corporation. In such a situation the MNC may conclude an agreement with its subsidiary in the patent granting county. The existence of the agreement would suggest that the patent is being used, but the mere existence of the agreement does not necessarily lead to the exploitation of the patent within a reasonable period, thereby causes more delays before a compulsory license procedures could take place.

But how effective the grant of compulsory license has been as a measure designed to facilitate the working of patents? Such effectiveness can be measured by the following example:

"In Peru, out of the 4872 patents granted between 1960 and 1970, in electronics, chemicals, food processing, pharmaceuticals and others, only 54 were registered as being exploited which is less than 1.1% of the total. Similarly,

in Colombia out of a total of 3513 patents evaluated (2534 of which belong to the pharmaceutical sector and the rest to the textile and chemical ones), only ten were being exploited in the country"[76].

Although Colombia does not impose compulsory licenses (prior to the incorporation of Decision 85 and prior to the Decree 410 (1971)) while Peru did, it is clear that in both countries there was not much change and that Peru's compulsory license provisions did not attribute to the fact that 98.9% of patents were not worked. Another reason to doubt the effectiveness of compulsory licensing is that foreign patent holder may consider such measure to be a lesser evil compared with losing his patent through revocation or lapse, and the danger of being faced with an uncontrolled use of his process or invention, or to share the market with new competitors. Equally, the grant of compulsory license may not lead to the actual working of patents since additional know-how would still be required to work the patent even if patents were successfully disclosed, there are other aspects which are beyond the patent document. In such a situation and if the granted compulsory license cannot be worked without the co-operation of the patentee, plus if he withholds his co-operation it may be in the interest of the granting country to make the patent lapse. However, not all patents can be worked since some may have lost their economic value or may not be economically feasible to exploit. So, compulsory license should be first directed towards those patents which are being worked abroad and use the granting country only as a market.

Compulsory licensing as embodied in Article 5(A) with no additional instrument such as revocation does not allow developing countries to employ the full of economic instruments at their disposal. Thus, it is essential for the developing country to move from the limited instrument provided by the Convention, which has so far proved to be a poor remedy. A maximum flexibility in the selection and application of instruments other than compulsory licensing may lead to the direct industrial use of information derived from the patent and avoid lengthy and costly delays, which may be reduced if revocation and expropriation were included.

THIRD: Independence of patents. The principle of dependence of patents is an inevitable consequence of the fact that countries remain free to decide for themselves on matters concerning patentability, duration, renewal, examination or registration and so on. In this respect, the principle is consistent with the notion of each country setting its own standards as far as patents are concerned. However, the principle carries unfavourable impact on the developing countries, where there is a shortage of technical staff to examine patent application carefully. The consequence of the principle is that, when a patent has been forfeited in one country it can remain in force in other countries, unless positive measures are taken to render it null. The result is that the developing countries under the present Article 4 bis can continue to grant monopoly privileges to products which have been declared as non-patented in the country of origin, because the majority of the developing countries depend to a great extent on decisions of novelty made in the developed countries when granting monopoly rights in their markets to foreigners.

The above situation would not occur, if developing countries were to incorporate in their patent legislation provisions requiring the applicant for a patent to submit to the competent authority the result of earlier applications in other countries and in particular the result of the first application[77].

This requirement would certainly reduce the cost for the developing countries, as some of the developed countries such as the United States require their nationals to file application first at home. It would be more helpful to the developing countries, if it was made compulsory to exchange information between patent offices when required of all orders - judicial and administrative-concerning the validity of patents.

FOURTH: The priority right: The principle of priority right embodied in Article 4 of the Paris Convention allows any person who has filed an application for a patent in one of the countries of the Union to have a priority right of twelve months. Such principle is seen by the developing countries as a disincentive to local R & D since someone by virtue of priority right will be granted the patent. It is also claimed by the developing countries that foreign applicant deliberately delays filing in developing countries until the last month of the priority period in order to lengthen the life of the patent[78]. However, earlier or later filing would not effect the duration of the patent, since patents merely run from an earlier or later filing date, but when coupled with the principle "independence of patents" it would lead to an extension which can be calculated on the difference between the patent lapses in two countries where the

term of patent life is equal. The remedy to such an extension can be done in national legislation through the shortening of the duration of patents as some developing countries have already brought such reform.

The legal details embodied in the Convention, for the establishment of the priority right principle can only serve to safeguard the interest of the applicant. Section (B) of Article 4 establishes that the novelty of an invention cannot be affected by reasons of any act accomplished during the priority period. In other words publication or exploitation of the invention by any one does not, during the priority period, invalidate the patent application in other countries in which the priority privilege is required.

To safeguard the interest of the developing countries, certain reforms ought to be included when the principle of priority right is applied for such as, the applicant for the right should be obliged to submit the results of his earlier application, and to allow the developing countries to exploit their inventions, if they have, in good faith, filed an application during the priority period. Further, to accord preferential right to inventions originating in developing countries with regards to the duration of the priority period.

The principles embodied in the present Convention governing the industrial property, and despite its revision six times remain in favour of patent holders (in most cases multinational Corporation). So far patents have failed to contribute either to encourage rapid

transfer of the technology or to act as a stimulus to local inventiveness. If these standards are to contribute to the needs of the developing countries, a balance must be found between the right of the patent holder and the public interest of the developing countries. A more stringent provision should be included for the working of patents, which would contribute greatly to the diffusion of imported technology. Some hopeful signs are coming from some of the developing countries who already have introduced certain noticeable reforms in their national legislation.

NOTES:

[1] UNCTAD "The Patent system as an instrument of policy for national development" TD/B/C.6/AC.2/3 Geneva (24th July 1975) p2 para 5 and p28 para 94.

[2] According to Francis Stewart, there are still four problems for the developing countries which would continue to exist if such access to foreign technology was drastically changed.

First: technology trade is one of the financially most expanding and thus considerable direct and indirect costs for importing technologies will remain.

Second: Imported technology - (large portion of it) - would have to be adapted to new economic structure of the receiving countries, which would add to the social cost of technical charges and force the receiving developing country to devote its scarce R & D resources to purposes other than those necessary.

Third: the control of imported technology would remain since the suppliers would restrict its use whenever possible (i.e. export restrictions).

Fourth: The development of an effective and independent innovative capacity of the developing countries is impeded. See Francis Stewart (1977) "Technology and underdevelopment" Macmillan London. Also in UNCTAD is "Coordinated Technological Research and Development in Developing Countries, Regional Co-operation to Strengthen Indigenous Capacities for Innovations" TD/B/C.6 (14.10.80) pl.

[3] Peter Nanyenya, T. (1980) "Technology transfer and International Law" PRAEGER US. pl20.

[4] A. King et A. Lemma "Recherche scientifique et developpement des techniques in Nord, Sud: du defi au dialogue 73^{eme} Repport du club de Rome (1978) p345.

[5] It is clear that even the very high number of researchers is not synonymous of technological autonomy. Thus India, for example, is not exceeded in this field except by the United States and USSR: Kamel Bouguera (1976) Annuaire de L'Afrique du Nord p44.

[6] S. Thebaud (1976) "Les systemes de Recherche scientifique et technique des pays envoie de developpment "THERS MONDE T:XVII no.65 (Janvier-Mars) pl35.

[7] The term technology made its first appearance in Germany around 1770 according to H. Rose and S. Rose (1970) "Science and Society" Pellican Book pl6. Technology transfer was defined as follows: "Technology viewed as a commodity and embodied in capital and intermediate goods, in highly skilled manpower and in blue print process formula or other kinds of proprietary ... and non-proprietary information is the subject of world-wide transaction" See Guidelines for the study of the transfer of technology to developing countries UNCTAD TD/B/AC.11/9 (UN Publication Sales no. E.72 II.0.19) "Process whereby a technology (industrial or otherwise) developed and eventually applied by an organization is utilized for production purposes by other's organization or enterprise". See Economic Commission For Europe" Glossary of terms relating to technology transfer, industrial co-operation and business planning" Note by the Secretariat (SC.TECH/SEM.3/R2).

[8] To Vaitsos, it is a mistake to consider patents as a vehicle for TOT: "a patent is a legal document which gives an exclusive privilege to undertake production, make sales or import specified products or processes which meet certain legal requirements. In itself therefore, the patent has no more to do with technology transfer proper than for example a document which confirms the lease of a factory or a legal paper which verifies the ownership of a house". Constantine Vaitsos (1972) "Patent Revisited - their function in the developing countries" *Journal of Development Studies*, Oct. p80.

[9] Freeman, C. C., H. G. Oldham and Turkean (1968) "The transfer of technology to developing countries" UNCTAD 2nd World Conference.

[10] Douglas F. Greer (1973) "The Case against Patent Systems in less developed countries" *Journal of International Law and Economics* p240.

.. See also, E. T. Penrose (1973) "International Patenting and the less-developed countries" *Economic Journal* Vol:83 pp771-2.

[11] C. Vaitsos op cit p73.

[11a] The United States in its preliminary comments on paragraph 6 of the UNCTAD Secretariat report (TD/B/C.6/AC.3/2) which expresses concern on the ownership of patents by foreigners in developing countries also claims "that the vast majority of inventions in developed countries are not patented at all in any developing country". It stated Argentina as an example, where in 1975 a total of 1341 patents were granted to the residents of US, Japan and the

Federal Republic of Germany. In the same year the three countries granted 92,672 patents to their own residents. The preliminary comments of US also claims that most of the patented inventions in the developed countries are available on a "royalty-free" basis in the developing countries. For more details see: the UNCTAD United States of America: Preliminary comments on the REPORT BY THE UNCTAD SECRETARIAT entitled: The International Patent System: the Revision of the Paris Convention for the Protection of Industrial Property (UNCTAD TD/B/C.6/AC.3/2) in (TD/B/C.6/24/add.1) and TD/B/C.6/AC.3/4 Add 1) Annex V.P8.

[12] The high percentage of patents ownership by non-residents in France, Canada and U.K. in Annex 2:1 cannot be seen in the same way as other developing countries.

It is clear from WIPO statistics that the high percentage of foreign ownership in developing countries is correct. 80% of patents granted in developing countries were to foreigners in 1975. See WIPO Industrial Property Statistics 1975, IP/STAT/1975/2, 1 June 1977, pp8-11. However, the high percentage is not peculiar to developing countries as in some other industrialized countries the figure is higher; such as Belgium and Australia 92% and 91% to Denmark. On the other hand for several other developing countries the percentage is lower; such as South Korea (around 50%) and Greece (around 30%). Except in the US, Japan; foreigners share is regularly above 50%. Based on this, the assertion of foreign domination may become questionable.

[13] The importance of patenting by nationals of developed countries in each of the developing countries differ from one country to another, but on the whole USA, F.R. of Germany, Japan, France, UK and Switzerland often occupy the first six places: See UNCTAD TD/B/C.11/R/Rev. 1 op cit. table 9.

[14] The 5170 patents registered by foreigners in Algeria consist of the following type of protection:-

- (i) 4730 patents, representing a total of 89.5%;
- (ii) 272 patents of confirmation or 5%, they concern patents granted in foreign countries prior to March 1966 the date in which the patent law of Algeria was enacted: Ordinance: 66.54 du 3 Mars 1966 RELATIVE AUX CERTIFICATES D'INVENTEURS ET AUX BREVETS D'INVENTION: Journal official 8 Mars 1966.
- (iii) 69 certificates of addition or 1.3%, granted for an appropriate addition to the invention.
- (iv) 99 maintenance or preservation "maintien en vigueur" patents registered in 1966, 1967 and 1968 and concern inventions which were protected in Algeria before July 3, 1962.

During the same period the total of inventor certificates which is the only form of protection open to Algerians (Art. 7 of 1966 law, was 113 or 2.1%.

[15] The free patent documents received by the INAPI came from the following countries in order of importance:

COUNTRY	PERIOD	SERIAL NUMBER OF DOCUMENTS	NUMBER OF DOCUMENTS	LANGUAGE
FRANCE	1902-1980	317.502-2,434,000 ^(b)	1,870,000	FRENCH
SWITZERLAND ^(a)	1889-1980	1-618,620	618,000	FRENCH
				GERMAN
				ITALIAN
CANADA ^(a)	1950-1974	462,201-955,900 ^(b)	493,000	ENGLISH
				FRENCH
E. GERMANY	1963-1971	26,001-85,500	97,000	GERMAN
	1974-1980	104,073-141,967 ^(b)		
U.K.	1975	1,376,876-1,419,980 ^(b)	43,000	ENGLISH
AUSTRIA	1969-1980	267,501-357,800 ^(b)	30,000	GERMAN
BELGIUM ^(a)	Not Specified	731,101-760,101	29,000	FRENCH
BULGARIA	1976-1980	-	4,000	BULGARIAN
HUNGARY	1978-1980	-	3,000	HUNGARIAN

(a) documents obtained with the help of WIPO.

(b) no continuous documents provided.

Source: Unpublished INAPI Document No. ST/ALG/80/6, November 10, 1980.

The bulk of patent documents held by INAPI appears to be constituted of patent documents of the industrialized nations. However, these documents represent only a relatively important portion of world techniques. In fact, it is generally held that the collection of patents by USA, UK, F.R. of Germany, France and Switzerland represent about 80% of world techniques. It was explained to me by an official of INAPI, that the absence of US collection does not matter much, since for example the majority of patents deposited in France are of foreign origin including those of USA.

[16] The non availability of patent documents to the public is mainly due to the limited resources of INAPI. However, the INAPI is planning to have a consultation room in the near future, but these documents are now kept in an Archive Cellar at Boumerdes: See INAPI Doc. ST/ALG/80/6 op cit. p6.

[17] A study of 1866 inventions introduced between 1945-1974 in Europe, US and Japan furnished indications on the nature and orientation of those innovations:

- 59% were product innovations and 41 process innovations;
- 40% of the first and 47% of the second originated in US;
- 15% of product innovations and 38% of process innovation were directed toward the economy of labour saving, or 24% of the total (40% for US innovation saving);
- 22% of process innovations directed toward a capital economy;
- 33% of product innovations and 37% of process innovation were directed toward the economy of material saving which 35% of the whole calculated, according to W. H. DAVIDSON (1976) "Patterns of factors saving innovations in the Industrialized World" European Economic Review Vol. 8, no. 3, October 1976, tables 2 and 3 pp214-215.

[18] The non-adaptation of imported techniques will be discussed in full detail later in the case of Algeria. The problem is also discussed by C. COOPER (1972) "Science, technology and production in the underdeveloped countries" Journal of Development Studies Vol. 9, no. 1, October 1972; P. H. HASON (1974) "The Selection of Technology"

Colombia Journal of World Business Summer 1974 pp29-34; J. BARANSON (1966) "Transfer of technical knowledge by International Corporations to Developing Economies" American Economic Review May 1966, pp259-267.

[19] According to F. Stewart the adaptation by consumers in the developing countries to modern goods is inspired by optical normative, F. Stewart "choice of techniques in developing countries", Journal of Development Studies Vol. 9, no. 1, October 1972. Since the goods were conceived to satisfy the requirements of consumers at a high level, their consumption in developing countries appears to be unjustified when one takes into account the limited incomes.

[20] The sample of the selected developing countries may not be representative to the situation in developing countries, since the majority are African countries with little industrial basis let alone inventive activities. Other countries (India, Mexico, Colombia and Argentina) will be studied later as a group by themselves. Nonetheless, a UNCTAD study concerning patent distribution from 1920 to 1970 shows that the percentages of the 8 developing countries (Brazil, Cuba India, Israel, Mexico, Morocco, Tunisia, and Yugoslavia) were 1.9%, 1.7%, 1.8%, 4.4% and 3.9% in 1920, 1940, 1950, 1960, 1970 respectively. It was estimated that the share of the 8 developing countries was 6 per cent of the world patents or 200,000 patents out of the existing 3.5 million patents, of these only one percent was being held by national of the developing countries, 84% of the 200,000 patents were held by non-nationals mainly corporations of 5 countries namely U.S., U.K., France, F.R. of Germany and Switzerland. See UNCTAD/TD/B/AC.11/19/Rev.1 table 6, p81.

[21] See Chapter One "Source of Inventions".

[22] Four possibilities can be distinguished in which patents can be used. Firstly the working of the patented invention by the patentee or associated company; to manufacture goods of the patented product, or the use of the patented process in other than the country which originally granted the patent involves foreign investment. Secondly, to let the patented invention to be exploited by non-associated companies with patentee - to grant licenses. Thirdly; to import the patented product or products made by the patented process. Such importation is a direct result of the exclusivity of the right which only allows the patentee or his licensees to market the patented product. These rights are limited by the principle of territoriality to the granting country or countries by obtaining parallel patents in those countries. Fourthly, the non-working of the patented invention in any of the above forms.

[23] Watson Hamilton (1945) "Cartels, Patents and Politics" FOREIGN AFFAIRS VOL. 28, p587.

[24] For more details on the concentration of patents as a result of government financed R & D in US between 1946-1962 see: Donald Stevenson Watson and Mary A. Hamilton (1967) "Concentration of Patents from Government financed research in industry" The Review of Economics and Statistics Vol. XLIX pp375-381, table 2 in particular. See also, for effect of the shift in ownership: Vaughan F. L. (1948) "A Patent Policy: A discussion" American Economic Review: Papers and

Proceedings: Vol. 38, May p218; Khan, A. E., (1940) "Fundamental deficiencies of the American Patent Law" American Economic Review September p485. A UNCTAD study shows that the percentage of corporate ownership has increased from 49% in 1937 of which 45% to foreign firms to 80% in 1967, 78% of which belonged to foreign corporation. Equally in the same period patents awarded to individuals decrease from 50% in 1937 to 13% in 1967.

UNCTAD TD/B/C.11/19/Rev.1/table 10.

[25] WIPO, Ad hoc Group of Governmental Experts on the Revision of the Paris Convention, PR/GE/1/10 21 February 1975 p.3, UNCTAD, The Role of the Patent System TD/B/C.11/19 23 April 1974, p123.

[26] The eight countries with number of patents held and percentage of non-worked patents: US 5257 of which 81% non-worked; Mexico 797 (18.7%); West Germany 454 (84.1%); UK 333 (82.9%); France 355 (92.1%); Japan 327 (94.5%); Switzerland 303 (91.4%) and others 777 (87%). The total of non-worked patents is 6652 UNCTAD TD/B/C.6/AC.5/3 p22 table 7.

[27] Government of India, 1959 "Official Report on the Revision of the Patent Laws" NEW DELHI pp28-29.

[28] The 17 countries in which the reporting companies have patents are Algeria 264 patents; Libya 238 patents; Morocco 834 patents; Tanzania 242 patents and the office Africain et Malgache de la Propriete Industrielle "OAMPI" Countries 810 patents (Cameroon Central African Republic, Chad, Congo, Dahomey, Gabon .. etc see the rest of

One list in Annex 2:3 op cit.): HELGE. E. GRUNDMANN (1976) "Foreign Patent monopoly in Developing Countries: An Empirical Analysis" Journal of Development Studies Vol. 12 (1975/76) pp186-196. See also SANJAYA LALL (1976) "The Patent system and the transfer of technology to less developed countries" Journal of World Trade Law, Vol. 10 no. 1 Jan-Feb pp1-16. He suggested that with the increase of modern technology in the industrialized countries patents lost much of their importance in securing market power and that there is no clear answer on why firms which do not depend on patents as a source of market power bother to take out patents at all except to suggest the various possible motivations:

- A device to limit areas of operation on cartel-like lines (as in chemicals).
- A legal device to base licensing on and frighten off smaller innovators.
- A monopolistic device to strengthen marketing SANJAYA LALL op cit. pp9-10.

[29] According to the same questionnaire the companies (20 of them) which did not grant licenses, advanced the following motivations for not doing so.

(i) Inadequate market 14 companies, (ii) unfavourable economic conditions 8, (iii) insufficient industrialization 6, (iv) inadequate patent protection 5, (v) no request 3, (vi) political instability 2, (vii) exchange restrictions 2, and (viii) no real interest from the patentee side. H. E. Grundmann op cit. p194.

[30] UNCTAD TD/B/C.11/19/Rev.1 1975 op cit. p64.

[31] S. LALL (1976) op cit. pl0.

[32] SIEGFRIED GREIF (1981) "Strengthening the Compulsory Working of Patents in Developing Countries: Law and the State Vol. 23 p59.

[33] Such situation may apply to the pharmaceutical industry where patents do not add to the effective control of the developing countries markets but help to prevent potential threats by the local or foreign firms. S. Lall (1976) op cit. p9.

[34] See Seigfried Grief op cit. p59-61, who argues that more R & D is directed towards new products or processes which are predominantly or specially for use in developing countries.

[35] S. Lall (1976) op. cit. pl0 Unlike Lall, both Vaitzos and Penrose stress the cost of non-worked patents. C. Vitsos (1972) op cit. pp82-83. E. T. PENROSE (1973) "International Patenting and The Less Developed Countries" Economic Journal Vol. 83 p778.

[36] KALTZ "Patents, The Paris Convention and Less Developed Countries" Yale University Economic Growth Centre, Discussion paper 190, Nov. 1974, p67.

[37] Patel (1973) "Transfer of technology and third UNCTAD" 7 Journal of World Trade Law p227. The amount paid by the developing countries to seven industrialized countries. Frnace (1977); US (1978); UK (1977); Japan (1977); Italy (1975); F.R. of Germany (1978) and Netherlands (1977) was 1440 million US dollars of which \$530 million

came from Latin America; \$730 million from Asia and the Middle East; and \$180 million from Africa. See for more details RENE-FRANCOIS BIZEC (1981) "les transferts de technologies" Que-sais-je: Press Universitaire de France table 1 and table 2 at 78 and 83 respectively.

[38] The situation was no better in the Andean Group Countries (Bolivia, Colombia, Chile, Ecuador and Peru) statistics show that out of 451 technology contracts in various sectors, 307 contracts or 68% explicitly prohibited any form of exportation. For more details see UNCTAD "Policies Relating to technology of the Andean Pact: their foundation" TD/107 (29 Dec 1971) paras 14-20.

[39] C. Vaitzos (1972) op cit. p81. The same conclusion was also reached by others. Example ".... transfers which simply provided enterprises in developing countries with permission to exploit patents would very probably fail commercially" CHARLES COOPER (1970) "The Mechanism for Transfer of Technology from Advanced to Developing Countries" Science Policy Research Unit - University of Sussex p.17.

[40] Percentage of all assets

Percentage of all

involving Patents

assets involving know-how

ALGERIA	85%	81%
INDIA	34.4%	91.9%
LATIN AMERICA	67.9%	71%
PHILIPPINES	44.4%	63.7%
INDUSTRIALIZED		
COUNTRIES	85.5%	37.7%

[41] The high level of patents percentage is not due to the high level of industrialization, but rather to a different sets of contracts as we shall see later.

[42] The following countries do not as yet have patent laws as in 1974: Africa (Equatorial Guinea, Ethiopia, Guinea and Mali); Asia (Bangladesh, Bhutan, Burma, Democratic Peoples Republic of Korea, Khmer Republic, Laos, Maldives, Mongolia, Afghanistan, Thailand, United Arab Emirates & Yemen) See: TD/B/C.11/19. Annex 1.

[43] Andean Commission: Decision 85 on Industrial Property May 27 June 5 (1974): Official text in Grupo Andino separate No. 28 June 1974 pp11-12. International Legal Materials (1974) pp1489-99. See Also Article 3.

[44] For more details on non-patentable subject matters see: J. W. Baxter (1973) "World Patent Law and Practices" London. Sweet & Maxwell Appendix 1 "Chemical and Pharmaceutical Inventions: Allowable Claims" pp348-351; UNCTAD "The Role of the Patent System": TD/B/C.11/19 Table 14, Field of exclusion from patentability in selected countries pp16; Notes "Patentable Subject Matters Under National and Multinational Systems" Law and Policy in International Business Vol. 2 (1970) pp479-504.

[45] See the Laws of India: Patent Act Law 1970, Ecuador Decree 951 (1977) where the process to manufacture those products are also excluded from patentability;

Algeria: Ordonance 66-54 of March 3, 1966

Article 5;

Mexico: Law on Inventions and Trade Marks 30 Sept, 1975;

Peru: Law no. 18350 came into force Jan 27, 1971;

Brazil: Law no. 5772 of December 21, 1971.

For selected legislations, policies and practices on the transfer of technology:

TD/B/C.6/AC.1/2/supp 1/Add 1/(4 Feb 1975)

TD/B/AC/2 (10 Sept 1976)

TD/B/C.6/48 (28 August 1978).

[46] Algeria Patent Law (1966) Art. 13 which reads as follows:-

"Le brevet confere a son titulaire le droit:

- de fabriquer ainsi que d'utiliser, mettre dans le commerce
ou detenir a ces dernieres fins le produit couvert par
le brevet.

- d'employer, mettre dans le commerce le procede, objet de
l'invention brevetes ainsi que d'utiliser, mettre dans le
commerce, detenir a ces dernieres fins, le produit tel
qu'il resulte directment de la mise en oeuvre du procede
sous reserve des dispositions previe a l'Article 5"

It should be noted, that patents are open only to non-Algerians.
Algerians can only be granted inventor's certificate which establishes
the following rights: Article 8 Law (1966).

- to make the invention public;
- to receive a remuneration calculated on the basis of the
economic and social effects of the application of the
invention.
- to participate actively in the examination, the initial and
subsequent development of the invention in the country.

[47] Article 28(2) of Decision 85 reads as follows:-

"The patent shall not confer an exclusive right to import the patented product or one manufactured under his patented process".

Decision 85 was adopted by Ecuador on 10 March 1977, Colombia 28 June 1978; and Peru 15 May 1979.

[48] See UNCTAD "Examination of the Economic, Commercial and Development Aspects of Industrial Property in the Transfer of Technology to developing countries" TD/B/C.6/AC.5/3 24 Nov 1981.

[49] The deletion of Article 5 Quarter was proposed by the developing countries during the revision of the Paris Convention; See WIPO Diplomatic Conference on the Revision of the Paris Convention, Geneva 4 Feb to 4 March 1980, Basic proposals on Inventions (1979) Vol. 1 Patents (WIPO publication No. 840 (E) for comments on import monopoly p.84.

[50] Andean Pact Decision 85 Art. 29.

"A patent shall be granted for a maximum of ten years, computed from the date of the administrative resolution granting it.

Initially, it shall be granted for five years and in order to obtain an extension, the owner must prove to the competent national office that the patent is being adequately exploited".

[51] Ibid Article 34.

[52] Ibid Article 39.

[53] See J. W. Baxter (1973), p334. In the Philippines, special compulsory license may be granted to meet investment requirement. All processes and products involved in an industrial project approved by the Board of Investment shall be deemed products vital to the national defence or economy or to public health: PRESIDENTIAL DECREE 1263, Amending Portions of the Act no. 165, 13 Feb 1978 (Art. 34B).

[54] Algeria's Patent Law Ordonance 66-54 (1966) Art 53. The provision would have more impact if Algerians were entitled to patent protection as the majority, at least for the time being would not have been able to exploit their invention. However, since nationals are entitled only to inventors certificate where the right to exploit belongs to the state, the provision has no relevance to the foreign patent holder - mainly MNCs - as more profitable ways are open to them.

[55] Decision 85 op cit. Article 29.

[56] Colombia Patent law, Decree No. 410 (1971) in J. W. Baxter (1973) op cit. p331.

[57] Peruvian Law No. 18350 (1970) in J. W. Baxter (1973) p.324. The Indian Patent Law of 1970 grant patents for the term of 14 years, 7 years from filing or 5 years from granting whichever is shorter in the case of the drug patents.

[58] Mexican Law (1975) Art. 43.

[59] Article 31, Decision 85: "Exploitation shall be understood to mean the permanent and stable use of a patented process, or the manufacture of a product protected by the patent, to supply the market with its final results under reasonable trade conditions provided these acts take place on the soil of the Member Nations which grant the patent, asame for the stipulation on the sectorial programmes of industrial development covered under Articles 33 and 34 of the Cartagena Agreement".

[60] According to the India Law (1970) Article 52 (iv) the market may include export market as well and to meet such export "to an adequate extent and under the right conditions" to markets not covered by the exploitation of the market.

Section 135 of the WIPO (1979) Model Law include importation in the definition of exploitation on the grounds that if the patentee exploits the patent locally he shall be protected against the sales by others of imported products.

Exploitation was also defined by the Algerian patent law as follows:-

"Au sense du present Article, on attend par exploitation d'une invention, brevetee, la fabrication du produit brevete, l'emploi d'un procede brevete, ou l'utilisation pour une fabrication d'une machine brevete par an etiblisement existant dans le pays et dans une mesure appropries et raisonnable"

Article 44.

[61] Article 43 of the Mexican Patent law (Preliminary provisions) TD/AC.1/2 p26. See also Article 34.3 of The Philippines Presidential Decree 1263; Brazilian Code of Industrial Property Art. 33.2.

[62] Article 23 of the Brazilian Code of Industrial Property.

[63] Under Article 50 of the Mexican Patent Law, gives the patentee an opportunity to remedy any deficiency by granting him a preferential right to expand exploitation to cover national and international market. In cases of failure to comply, the competent authority may grant compulsory licenses to any interested person.

[64] "L'importation ne constitue pas une cause legitime" (Art 44).

[65] Ordonance 66-54 (1966) Article 45 See Also, Article 48 of the Mexican Patent Law on compulsory licensing where the patent lapses if within the year following the three years period nobody applied for compulsory licenses "The patent shall lapse if more than a year after the period referred to in article 41, the patentee has not begun the exploitation or if within that time, no application for compulsory licenses have been made" Philippines Presidential Decree 1263 of 1978 made the term shorter from three years to two years from the grant. In India, "license of right" as well as compulsory licenses may be applied for after 3 years. If the requirement of the public are reasonably met and two years after the grant of compulsory licenses, the patents can be revoked.

[66] The increase in patenting in Algeria (see Annex 2:2) is due to the heavy investment in Industrial projects included in the three plans: 3 Years Plan (1967-1969); First Four Years Plan (1970-1973), and the Second Four Years Plan (1974-1977).

[67] See UNCTAD Study "The implementation of transfer of technology regulations: A preliminary Analysis of the Experience of Latin America, India and The Philippines", TD/B/C.6/55 and Corr 1 table 2.

[68] UNCTAD TD/B/C.6/AC.5/3 op cit para 72.

[69] Ibid, para 74-75 as well as table 6 p20. See also Mexico where a survey established that out of 22,736 patents registered in Mexico as of Feb 1980 only 1951 patents were worked or 8.6% out of the 20,785 non-worked patents, 14,133 were revoked in accordance with Art 48 of the Mexican Patent law, leaving 8,603 patents in force but not worked: ibid table 7 p22 and para 75.80.

[70] A number of Resolutions calling for the revision of the international industrial property system were adopted by various agencies of the United Nations and other organizations such as:

- General Assembly Resolution 1713 (XVI) 19 Dec 1961 request the Secretary General to prepare a study on the effect of patents on the economy of the less developed countries.
- UNCTAD Third Session adopted unanimously Resolution 39(III), which in para 10 called for a study on the role of the patent system in the transfer of technology.
- General Assembly Resolution 3362 (S-VII) Section 3 para 10 provided that "International Conventions on patents and trade-markets should be reviewed and revised to meet in particular the special needs of the developing countries".
- In December 1975 the WIPO Ad hoc Group of Governmental experts on the Revision of the Paris Convention, stated that "The

revision of the Paris Convention should aim at contributing to the establishment of a new economic order in the world in which social justice prevails and economic inequalities between nations are reduced".

- The Ministerial Meeting of the Group of 77 held in Manila (Jan-Feb 1976) stressed in the Manila Declaration and Programme of Action that "the economic, trade and development interest of the developing countries should be fully reflected in the revision of the international system of industrial property"
- See UNCTAD TD/195.
- See also the views of the experts from Developing Countries who participated in the Group of Governmental Experts on the role of the patent system in the transfer of technology. Geneva 1975: The Report of the Committee on transfer of technology on its first session: official records of the Trade and Development Board, Seventh Special Session Supplement No. 4 TD/B/593 Annex III.

[71] The Paris Convention was signed in Paris 1883 and was revised at Brussels in 1900; Washington in 1911; The Hague 1925; London 1934; Lisbon 1958 and Stockholm 1967.

[72] One only has to look at the negotiations of the Third United Nations Conference on the Law of the Sea (UNCLOS III) to find out how lengthy such process is (from 1973 up to the present time). Thus, while developing countries are following the international process, it is by no means the only way and its about time to begin introducing new ideas and principle in their national legislation which would help their bargaining position.

[73] C. Vitsos (1976) "The Revision of the International Patent System. Legal Consideration of the Third World Position" World Development Vol. 4, No. 2, p90.

[74] Article 2(i): "Nationals of each of the countries of the Union shall with regards the protection of industrial property, enjoy in all the other countries of the Union the advantages that their respective laws now grant or may thereafter grant to nationals without prejudice to the rights specially provided by the present convention. Consequently, they shall have the same protection as the latter and the same legal remedy against any infringement of their rights, provided they observe the conditions and formalities imposed upon nationals".

[75] For more discussion of the national treatment principle, see C. Vaitos (1976) op cit. pp89-90. The role of the Patent systems UNCTAD TD/B/AC.11/19 paras 317-324; TD/B/C.6/AC.3/2 paras 76-79. The experts of the Group of 77 believe it is indispensable to establish a system of non-reciprocal preferential treatment in favour of the developing countries involving flexibility concerning the level and type of fees, priority, duration of protection: TD/B/C.6/12 21 Nov 1975.

[76] UNCTAD "Transfer of Technology: Policies relating to the transfer of technology of the countries of the Andean Pact, their foundation" TD/107 29 Dec, 1971. TD/B/C.6/AC.3/2 paras 26-49.

[77] Requirement of this type was included in the Brazilian Law No. 4131 of 1962 on foreign capital, "An application for the registration

of a contract for transfer of finance and payment of royalties for the use of patents ... shall be accompanied by a certificate of the existence and continued validity in Brazil of the privileges granted in the case by the National Department of Industrial Property, and by a valid document providing that they have not lapsed in the country of origin". (Law 4131 (art 11) in TD/B/C.6/AC.1/2 Supp 1/Add 1).

[78] See UNCTAD TD/B/C.6/AC.3/2 op cit para 64.

ANNEX 2:1: PROPORTION OF PATENT OWNERSHIP BY NON-RESIDENTS
IN SELECTED DEVELOPING AND DEVELOPED COUNTRIES

COUNTRY	1965	1976	1979
DEVELOPING COUNTRIES	%	%	%
ALGERIA	98.4 (1966)	98.3	98.5 (1978)
ARGENTINA	77.7 (1970)	69.2	n.a.
BOLIVIA	89.5 (1970)	83.5	84.2
CHILE	91.5	89.5	n.a.
COLOMBIA	93.4	78.6	95.7
INDIA	90.2	82.6	n.a.
DEVELOPED COUNTRIES			
UNITED STATES	19.5	37.2	37.4
JAPAN	33.8	19.5	21.0
F.R. OF GERMANY	40.8	50.4	51.7
FRANCE	65.1	71.1	72.2
UNITED KINGDOM	74.7 (1970)	77.7	79.9
CANADA	95.3	94.0	94.0

Source: various source including:

- World Intellectual Property Organization "WIPO" "Industrial Property Statistics" Annual Issues 1969-1979.

- BIRPI (WIPO) La Propriete Intellectuelle, Revue Mensuelle of WIPO and BIRPI: Various numbers.

- Ministere Des Industries Legeres: Institut Algerien De Normalization et de Propriete Industrielle "INAPI", Activities 1973-1978 Decembre 1979 p7 (for Algeria only).

- UNCTAD "The Role of the Patents in the Transfer of Technology to Developing Countries" TD/B/C.11/19/Rev. 1.

ANNEX 2:2: ANNUAL EVOLUTION OF FOREIGN PATENTING IN ALGERIA

1966 - 1978

COUNTRY YEAR	FRANCE	U.S.A.	F.R. OF GERMANY	ITALY	SWITZERLAND	U.K.	U.S.S.R.	OTHERS*	TOTAL
1966	90	73	11	5	-	20	1	40	240
1967	132	132	38	7	13	23	17	50	412
1968	128	77	20	18	18	14	28	71	374
1969	101	58	40	5	21	20	20	108	373
1970	121	46	39	60	25	14	8	63	376
1971	89	82	17	44	44	13	12	65	366
1972	72	72	24	43	30	10	6	60	317
1973	94	66	31	46	28	7	2	71	345
1974	112	96	41	43	35	16	1	109	453
1975	174	142	73	30	27	22	11	101	580
1976	127	84	38	33	27	26	7	116	458
1977	133	67	62	31	23	17	5	83	421
1978	138	77	77	29	29	12	4	89	455
TOTAL	1511	1072	511	394	320	214	122	1026	5170
in %	29.2%	20.7%	9.90%	7.60%	6.20%	2.40%	2.4%	19.8%	100%

* "Others" which represent 19.80% of the total foreign patenting in Algeria include about 40 countries, some of which are: Spain, Belgium, Japan, Canada, Sweden etc.

Source: Ministere Des Industries Legeres INAPI op cit. p8.

ANNEX 2:3: PATENT APPLICATION FILED IN SELECTED REPORTING COUNTRIES 1969 - 1978 ^(A)

ECONOMIC GROWTH YEAR	DEVELOPED COUNTRIES (B)		SOCIALIST COUNTRIES (C)		DEVELOPING COUNTRIES (D)		TOTAL
	TOTAL (E)	% NON-RESIDENT	TOTAL (E)	% NON-RESIDENT	TOTAL (E)	% NON-RESIDENT	
1969	370,726	% 46	14,836	% 57	5,992	% 76	391,554
1970	397,674	% 43	15,655	% 57	5,706	% 74	419,035
1971	372,569	% 46	15,834	% 58	5,848	% 73	394,251
1972	391,914	% 44	15,890	% 58	6,027	% 72	413,831
1973	409,889	% 43	16,640	% 59	6,207	% 68	432,736
1974	404,716	% 42	17,958	% 56	9,377	% 84	432,051
1975	402,896	% 39	16,859	% 54	9,570	% 82	429,325
1976	406,473	% 39	15,915	% 48	9,266	% 78	431,654
1977	402,897	% 39	15,054	% 48	8,366	% 81	426,312
1978	400,516	% 38	14,981	% 45	9,527	% 85	425,024
TOTAL	3,960,265	% 41.9	159,622	% 54.0	75,886	% 77.3	4,195,773

Source: UNCTAD TD/B/C.6/AC.5/3 table 1 p.14 with slight changes, based on WIPO "Industrial Property Statistics": annual issues of 1969-1979.

(A) The selected countries represent on average 60% of patents for all reporting countries.

(B) Developed countries include: Canada, France, Federal Republic of Germany, Japan, Netherlands, Turkey and USA. Turkey's data for 1969 is estimated on the basis of 1969-1971 and 1977-1978.

(C) Socialist Countries include: Hungary, Poland and Union of Soviet Socialist Republic.

(D) The selected developing countries are: Algeria, Egypt, Iran, Iraw, Kenya, Republic of Korea, Morocco, OADHI countries (Benin, United Republic of Cameroon, Central African Republic, Chad, Congo, Gabon, Ivory Coast, Mauritania, Niger, Senegal, Togo and Upper Volta), the Philippines and Sri Lanka. Sri Lanka's data for 1978 is estimated on the basis of 1979.

(E) Total of all resident and non-resident applications during the year.

**ANNEX 2:4: RESTRICTIVE BUSINESS PRACTICES INCLUDED IN LICENSING
AGREEMENTS IN INDIA AND THE PHILIPPINES**

TYPE OF RESTRICTIONS	NUMBER OF AGREEMENTS WITH RESTRICTIVE CLAUSES		
	INDIA (a)	INDIA (b)	PHILIPPINES
Export restrictions (total)	455	161	82
Global ban on export	36	3	49
Export denied to certain countries	42	60	4
Prior approval for exports	149	15	17
Export through specified firms only	20	16	6
Restriction on trademarks in exports	5	5	5
Other export restrictions	6	2	-
Other restrictions (total)	295	22	123
Tied purchase	154	16	67
Restricted production pattern	65	-	5
Payments of minimum royalties	55	4	13
Other restrictions	21	2	38
Total no of agreements with restrictive clauses (c)	527	171	126
Total of effective agreements	1051	342	254

Source: UNCTAD "Restrictions on exports in foreign collaboration agreements in India" U.N. Sales No. E.72.II.D.7 (1971).

- UNCTAD "Restrictions on exports in foreign collaboration agreements in the Republic of Philippines" U.N. Sales No. E.72.II.D.8 (1972).

(a) Approved agreements up to March 1964.

(b) Approved agreement from April 1964 to March 1969.

(c) The total cannot be obtained from adding export restrictions to other agreements since more than one type of restriction can be in one agreement.

ANNEX 2:5: DISTRIBUTION OF ASSETS BY TRANSFER'S TYPE IN SELECTED COUNTRIES

TYPE OF ASSETS	ALGERIA	INDIA	LATIN AMERICA	PHILIPPINES	INDUSTRIALIZED COUNTRIES (B)
Number of sampled Agreements	144	656	134	254	1019
Patents only	19%	1.7%	23%	0.4%	52%
Patents, Trademarks and Know-How	54%	21.16%	36.6%	25.9%	18.3%
Patents and Trademarks	-	2.54%	-	1.6%	0.3%
Patents and Know-How	-	9%	8.2%	16.5%	15.2%
Trademarks and Know-How	-	22.4%	18.7%	15.4%	1.8%
Know-How	15%	38.9%	75%	5.9%	2.4%
Trademarks	-	4.3%	6%	34.3%	10%
Plant in production contracts (a)	12%	-	-	-	-

Source: ALGERIA: Ministere des Industries Legeres: Institut Algerien de Normalisation et de Propriete Industrielle (INAPI) "Activities 1973-1978 par les chiffres" Decembre 1979 p23.

INDIA: Reserve Bank of India Bulletin "Foreign Collaborations In Indian Industry" (1962)

Reserve Bank of India Bulletin "Recent Trends in Foreign Investment in India" (1968)

Reserve Bank of India Bulletin "Foreign Collaborations in Indian Industry: Survey Report" (1974)

THE PHILIPPINES: UNCTAD "Restrictions on Export" (1972) op cit.

LATIN AMERICAN AND INDUSTRIALIZED COUNTRIES: BEHRMAN and SCHMIDT "New data on foreign Licensing" 3 Patents, trademarks and copyrights Journal of Research and Education, p370.

(a) Plant in production contracts include industrial property, technical assistance, training of personnel, equipments etc.

(b) Transfer of assets by US firms to other firms in the industrialized countries.

ANNEX 2:6: PATENT APPLICATION FILED IN MEXICO, INDIA, COLOMBIA, ARGENTINA AS COMPARED WITH

OTHER DEVELOPING COUNTRIES 1969 AND 1979

COUNTRY	1969		1979		INCREASE OR DECREASE 1969-1979		Total
	1	2	3	4	5	6	
	Resident	non-resident	Total	(2/:3)	Resident	Non Resident	
ARGENTINA	1832	5498	7330	75%	1598	2842	4440
						64%	-13
							-48
COLOMBIA	152	1117	1269	88%	37	383	420
						89%	-76
							-66
INDIA	1231	4215	5446	76%	114	1818	2932
						62%	-10
							-57
MEXICO	823	7404	8227	90%	692	3793	4485
						85%	-16
							-49
OTHER DEVELOPING COUNTRIES (a)	1438	4554	5992	76%	1429	8098	9527
						85%	-0.6
							+78
							+59

Source: TD/B/C.6/Ac.5/3 op cit pl6

(a) the same developing countries as in Annex 2:3 above.

**ANNEX 2:7: FOREIGN DIRECT INVESTMENT STOCK IN ARGENTINA,
COLOMBIA, INDIA AND MEXICO**

	\$ Million			COMPOUND ANNUAL GROWTH RATES (%)	
	1967	1971	1976	1967-71	1971-76
ARGENTINA	1800	2200	2250	5.1	0.4
COLOMBIA	728	900	1400	5.4	7.6
INDIA	1300	1600	2400	5.3	8.5
MEXICO	1800	4200	4650	7.4	14.1

Source: UNCTAD: TD/B/C.6/55 Table 3

(a) 1977

(b) 1971-77

CHAPTER THREE

REGULATION OF THE TRANSFER OF TECHNOLOGY:

AN EVALUATION OF THE NATIONAL LEGISLATIONS OF DEVELOPING COUNTRIES AND THE UNCTAD'S CODE OF CONDUCT

The discontentment with the present method of the transfer of technology "TOT" from developed to developing countries began as early as 1961, at the United Nations, in which the Resolution 1713 (XVI) called for the study of the effects of the patent system on the economies of the developing countries[1]. The developing countries maintained that they are the victims of the legacy of colonialism in general and rapacious practices of multinational corporations in particular. With the growing realization of the fact that traditional factors [Labour, capital and land] are no longer enough to ensure economic growth, the transfer of technology represented a major hope for improving their economic position. In modern economies the value of the traditional factors is limited since capital, if not invested in technology, would not increase productivity. The physical capacity of labour limits the output, and to increase productivity beyond this point machines or more systemized work patterns are needed. Finally, land and its natural resources can have little value or economic growth if the technology to unlock its riches was not available. Therefore, the economic growth of a nation is not determined by the mere presence of these factors, but largely by the technological application of the said factors.

In an age of multinational corporations "MNCs", which were often more powerful than many states, the question of the transfer of

technology assumed a further dimension. Because of their bargaining power and oligopolistic power, MNCs have become the source of conflict. They have designed TOT contracts to include terms favourable to their objectives of maximum profit. As a result TOT agreement often included restrictive clauses, directly restraining the efforts of the developing countries to increase the utilization and absorption of the transferred technologies and to develop local technological capacities.

The multinational corporations are the principal means of transferring technology to developing countries and may take one or a combination of more than one of the following methods; (1) licensing agreements, which involve the communication of technology protected by industrial property and under which the recipient country retains the national ownership of the business. A license agreement also enables the licensor to reap substantial return in the form of fees, royalties and profits from the sale of products, especially if he was unwilling to risk his capital or uncertain about the project's profitability or in countries where foreign capital participation was excluded. (2) Direct foreign investment entails the movement of capital across borders. A common form of this method is the joint venture, an arrangement whereby the ownership of business is shared between foreign investors and local partners, public or private. Direct foreign investment may also be a direct result of licensing agreements - particularly in the developing countries - because the licensor may feel he can exploit his technological advantage better by manufacturing abroad rather than licensing foreign firms, or because the licensee may lack capital and manufacturing facilities^[2]. (3) The transfer of technology may also take place under the form of

management contracts including the foreign technical assistance and the employment of experts or merely through the purchase of equipment and machinery[3].

Within these methods, multinational corporations use two approaches to maximize profits from the sale of technology to developing countries. First, multinationals protect their profits by including certain restrictive clauses in the TOT contracts. Second, the technology transferred to developing countries cost MNCs nothing, since such a technology has been developed for their own interests in order to maintain their position in the market. They then try to reduce the cost of such activities by selling the technology they have already developed rather than develop new technologies that suit the specific need of the developing countries. In this way, the technology suppliers avoid risks and expenses in developing special techniques and equipment where small market can not guarantee profits and recovery of R & D cost[4].

In recent years, the attitude of the developing countries towards science and technology have changed. Such change has resulted in more and more emphasis being placed on the question of the transfer of technology. The process of patent reforms which have occurred in some developing countries is, on one hand, a clear manifestation of this new attitude, and on the other hand, shows that the developing countries have not been satisfied neither by the UN Secretary General's conclusion and recommendations of 1964[5], nor by the Stockholm revision of the Paris Convention in 1967. Furthermore, the growing realization of the importance of the transfer of technology in

reaching development goals and the increasing disappointment with the present TOT methods have led to the establishment of specific bodies and the enacting of laws for the regulation of TOT agreements. Together with the UNCTAD code of conduct, these laws and regulations are undoubtedly of highly important significance to the future of the international patent law and the regulation of the transfer of technology. These regulations are closely linked to patent reforms.

There have been several attempts by developing countries and developed nations to regulate the transfer of technology^[6], the most complex and successful attempts being those of the Latin American countries. These laws and regulations have been used by the Intergovernmental Group of Experts as models for the UNCTAD's Code of Conduct on the Transfer of Technology^[7] and they are discussed below.

1. National Regulations:

A set of circumstances, during the 1960's, brought the attention of Latin American countries to the effects of imported technologies on the national economies. Among these circumstances was the weight of royalty payments on the balance of payments and the existence of substantial number of restrictive business practices in contractual agreements concerning the transfer of technology. Equally, governments of the region were aware of the need to control technology imports on a boarder basis. It was the Latin American countries who first initiated state intervention in matters of the transfer of technology^[8].

In Chile, the Board of the Central Bank decided to set up a commission to review royalty payments^[9], and to establish the registration of licensing agreements. A policy of approving or rejecting contracts was also envisaged but only on an advisory basis to the Executive of the Central bank. The legislative Decree 444 of 1967 established a committee responsible for the approval of agreements involving foreign transfers with respect to royalties, use of patents and trademarks which thenceforth to be registered with the Foreign Exchange Office of the Colombian Central Bank^[10]. Both committees have concentrated first on carrying out financial analysis of contracts, or in other terms, the impact of royalty payments on the balance of payments. Then, gradually took other functions such as the evaluation and negotiations of agreements.

The gained experience in these committees, especially that of the Colombian Committee on Royalties, was a significant factor which have led to more complex and systematic regimes, such as the Andean Group Decision 24 of 1970^[11]. Under Article 102^[12] of the Colombian Decree 444, the Royalties Committee should take account, inter alia, of the following criteria when authorizing or refusing the registration of contracts:

"(a) The importance of contract, in terms of economic and social development and the relationship between that importance and the disbursement of foreign exchange to which the contract may give rise;

(b) The feasibility of manufacturing the same product under similar conditions without the encumbrance of royalties by

the "use of normal process available for that purpose in the light of the advances in modern technology and the development of national industry";

(c) Public treaties entered into by Colombia and prevailing international practices in this field;

(d) The effect of the contract on the country's balance of payments;

(e) The size of the market for which the products manufactured under the contract are intended; and

(f) The period for which the patent is in effect".

The legal systems which have been adopted by the Latin American countries with regards to the regulation of technology transfer, through national legislation, have established screening procedures through the registration requirement and set-up special machineries to deal with TOT contracts.

Despite the differences between the various legislations of the nine countries^[13] which have adopted laws regulating the transfer of technology, there is a number of common principles concerning the manner in which state intervention can be governed in matters of TOT. The first principle to be noted in this respect is state intervention which is based on the view that the technology market is imperfect and national enterprises are thus in a disadvantageous position vis-a-vis foreign firms. Accordingly, the state intervention in the TOT process, might improve the position of the recipient country and the conditions under which transfer occurs^[14]. Up to the enacting of these laws, the TOT contracts were subject to the autonomous will of

the contracting parties, but now these have become a matter of public interest. The freedom to contract itself has not been removed by the said legislations, as parties are free to contract or not contract certain agreements. It is only after the parties decide to contract that the content of such a contract becomes conditional upon the authorization of the competent national authority which may reject or recommend changes in the terms and conditions of the proposed contract.

This form of state intervention is intended to convert the autonomous contractual freedom to a regulated one, the validity of which is subject to the government consent. The mere registration of contracts will provide governments with crucial information which would help the reviewing of proposed or existing contracts. This in turn could be of important significance to countries with a common system, as in the case of the Andean Pact, where at least the concerned government could bargain for an equal treatment.

In general, the regulation of TOT contracts are intended to achieve the following objectives: (a) to improve the commercial conditions under which contracts are concluded, in particular the price charged by the licensors; (b) to eliminate the inclusion of restrictive clauses; (c) to unpack technology transfers and to avoid the importation of technologies that are locally available, and (d) to improve the conditions for the adaptation and assimilation of the imported technologies[15]. Although the state intervention is somewhat limited, since it does not replace the decision of the national partner in a contract neither with regards to the selection

of technology, nor the firms which will supply it, it is hoped that national firms will be encouraged by such intervention to choose the technology they need and its suppliers more carefully. Such intervention - in so far as it is articulated with appropriate policies for the development of technology - is likely to contribute to the achievement of the forenamed objectives. As far as it aims at certain national goals, state intervention through the evaluation and registration of technology transfer contracts can only be considered a tool of public interest, inevitably intended to prevail over the private views and interests of the contracting parties.

The second common principle concerns the evaluation of contracts which implies the possibility of approving or rejecting the proposed contracts by the competent authority. Such evaluation comprises the following:

(a) A legal examination of contracts, such as the confirmity of contracts with national legislation [civil and commercial laws], the existence of the essential elements of the contract, the applicable law in cases of disputes and the identification of restrictive clauses;

(b) An economic evaluation which takes into account and consideration the effects of the proposed contract on the enterprise and the national economy of the recipient country, including the balance of payments, the use of national resources, employment, on a cost benefit analysis which would late guide the government in reaching its decision; and

(c) A technical evaluation of contracts, which remain very limited in practice, due to the lack of adequate information. There is no technical information in the contracts themselves except when disclosed in patents.

The rights and obligations of the contractors are valid only when such contracts have been registered[16]. In Mexico for example, the registration is obligatory if the contract was to have a legal effect and to be enforceable in the courts[17]. To carry out these functions, special machineries were set-up by the respective national legislations[18].

Although the machineries set-up by the Latin American countries were well established, there are factors which substantially limit the efficiency of such institutional bodies. Among these factors is the shortage of qualified and adequately trained personnel to carry out the three forms of evaluation (legal, economic and technical), as well as the monitoring of registered contracts. This limitation appears to be common to all machineries[19], but differ from one country to another. For example, Annex 3:3 shows a slow start in the evaluation of TOT contracts in Venezuela. In fact only 2 per cent of 844 contracts were reviewed by SIEX, while the higher number of "manifestacion de voluntad" instead of divestment is a direct result of Article 21 of Decree 63 of 1974. Under, the said Article, the Venezuelan Government undertakes to grant the status of "national investor" to foreign parties who request such status, providing that they renounce their rights to exporting capital and remit profits[20]. In contrast, Annex 3:4 shows that the process of evaluation was proceeding with some dispatch in Colombia.

The available information, on the activities of the competent authorities is by no means exclusive, and thus, can only shed some light on these activities. However, the highest number of applications and registrations of the transfer of technology contracts appears to have occurred in those countries with higher level of industrialization such as Brazil and Argentina[21]. Nonetheless, Annexes 3:3 and 3:4 confirm that the evaluation and review of TOT contracts are now being taken seriously in the Latin American countries. Equally important, the regulation of the transfer of technology contracts does not suggest that the inflow of technology has been hindered. One should also bear in mind that the inflow of technology does not solely depend on its regulation but on the treatment of foreign investment and the protection of industrial property as well. Important set of reforms have been introduced in both fields, i.e. the exclusion from patentability in certain vital sectors, the working of inventions and the elimination of import monopoly from the exclusive right of the patentee[22].

Despite the slow progress and the shortage of qualified personnel, the regulation of TOT contracts constitute a step forward in the right direction. In the long run, the experience gained in the established machineries and authorities would contribute significantly to the negotiating position of those countries who have adopted such measures, providing that it is incorporated in an industrial framework where different industrial instruments work toward the same goals.

In India, the regulation of the transfer of technology was initiated after independence in 1947, which makes it the longest among

the developing countries in the field of technology transfer. Two stages of this can be distinguished:

The first stage covers the period from 1948 to 1968, and can be described as a period of relaxation as far as the entry of foreign private investment was concerned. Agreements concluded in this period were not regulated, but left to the Central Government to approve in accordance with the general industrial policy, which was governed by the two Industrial Policy Resolutions of 1948 and 1956. The basic tendency of the policy was the Indian ownership, management and operation of enterprises. The only condition for the establishment of commercial enterprises was that majority ownership should be in the hands of Indian nationals, except where the national interest can be served otherwise[23]. The Industrial Policy Resolution of 1948 made no reference to technology imports.

However, by 1956, and after eight years interlude, political and economical developments rendered the content of the 1948 Resolution obsolete[24]. A new Industrial Policy Resolution was issued in 1956, narrowing the private sector's field and broadening the base of the public sector. It discarded the sectorial breakdown of the earlier Resolution, and covered issues in a much wider context[25]. Unlike the 1948 Resolution, there was no need for assuring to pay compensation for the acquisition of private industry.

The fact that no legislative criteria dealing with foreign collaborations was enacted until 1969, and no measures to implement the declared policies was advocated may be explained by the

conflicting objectives. On one hand, there was a need to establish and develop the Indian industries, thus requiring the importation of technology. Since foreign investment was linked to the inflow of certain types of technology, it was considered as an alternative form for paying for such technologies. On the other hand, the socialist pattern adopted by the Government, meant that the inflow of foreign investment into the country had to be consistent with the wide range objectives of the national policy.

The second stage covers the period from 1969 onwards. The Indian Government waited patiently until industries have been established in the country and then began to legislate. Approval of foreign investment by the Government had become more selective, taking into account the capacity to earn foreign exchange through export, the saving of foreign exchange by investments leading to import substitution and the extent to which the proposed transfer of technology is needed in India. However, foreign investment continue to be encouraged in those industries where adequate capacity does not exist in India, or in industries considered as basic or strategic, but where local investment is unlikely to be forthcoming, and in areas where indigenous technology is not being developed.

The general philosophy in this second stage tend to be the realization that a stable economy can only be built through the use of local resources, skills and currency. Furthermore, less foreign investment and foreign aid leads to self-reliance and accelerates economic growth, benefiting more people and creating fewer economic and political problems. To achieve these aims, the Indian Government

enacted legislations and established boards and commissions to follow the implementation of the declared policies:

(A) Measures relating to the screening and operation of foreign investment. To coordinate and supervise the establishment of industries, the Indian Government established the Foreign Investment Board on 27 November 1968, and entrusted it with the primary responsibility of deciding whether an investment proposal is acceptable or not. Before the foreign Investment Board takes the final decision, the evaluation and registration of contracts involves several competent authorities[27]. Proposals for foreign collaboration are first submitted to the Secretariat of the Ministry of Industry for industrial approval, which in turn seeks recommendations from various technical authorities through the technical evaluation committee. Only then, that the proposal can be considered by the Foreign Investment Board, and only when the technology is suitable and the proposal is in accordance with the Government overall policy that the terms and conditions of the contract are examined by the Board, which may suggest either acceptance, modification of the terms or rejection of the proposal[28].

A strict industrial licensing was imposed in the core and heavy investment sectors[29], and hardly allows private investment [foreign and local] to grow. Licenses are required for new industrial undertakings with an investment ranging between Rs 10 million and Rs 50 million, and those industries where a significant investment of foreign exchange is involved[30].

(B) Policy trends with regards to foreign investment in India. Since 1969, the trend towards foreign investment has been more selective and restrictive. Thus, when the Foreign Exchange Regulation Act "FERA" was adopted in 1973[31], it contained among others, the following principles and provisions: (i) As a general rule, equity participation can be allowed up to 40 per cent; (ii) all existing companies with more than 40 per cent of foreign capital participation were required to apply to the Reserve Bank of India for permission to continue business giving details of their proposals for increasing the share of Indian owned equity in their business; and (iii) foreign majority participation may be considered in exceptional cases, i.e. if the profits were re-invested in areas of sophisticated technology - [high technology concept] - or in export[32].

(C) The Monopolies and Restrictive Trade Practices Act "MRTPA" of 1969. The Act was enacted in response to the recommendations of the Monopolies Enquiry Commission which was established in 1964, and will be discussed within the context of restrictive business practices.

One of the objectives of national legislation has been the control of restrictive business practices embodied in TOT contracts. Three approaches have been used to control restrictive business practices "RBP": The first concerns the screening procedures of the transfer of technology contracts through the evaluation system - [legal evaluation of contracts], which is widely used by the Latin American countries, as previously explained. The second approach attempts to achieve the control of RBP through the patent legislation

by setting-up standards making null and void all clauses imposing restrictions[33]. The third approach uses antimonopoly or anti-trust legislation, most of which are comparatively new, except the laws of the United States and Canada[34].

To promote Science and Technology, patent laws provide inventors with a legal monopoly designed to reduce competition as a reward for their creative activities. However, patent holders do not only enjoy such privileged position but often try to gain more and more profits by imposing certain conditions and restrictions when such patents are licensed. The basic test in common law is, that the person imposing restraint must have a legitimate right or interest to protect and the restraint must be no more than is necessary thereof. The restrained person must not be unduly hampered in his ordinary trade, and the overall effect must not be harmful to the public interest. Patents in themselves inherent restrictions on export and import[35]. Export to countries in which the patentee has obtained a patent for the patented products may be prohibited unless the patent owner has given his consent[36]. According to L. MELVILLE, "a patentee does not have a legitimate interest in restraints of time and territory beyond those granted in the patent"[37].

Apart from restrictions inherent in patents, there is a substantial number of restrictions which have nothing to do with the patent grant. The objective of those restrictions embodied in TOT contracts is to build up, or maintain, or enhance a powerful position in the market. Whether the intention is defensive or exploitative, the classical prescription for improving own position is to exclude competitors from the market and confine the available trade as much as possible to a manageable number of participants.

Basically, the control of restrictive business practices under existing national and regional laws consist of three categories of practices. The first category lists restrictions and practices which are under absolute prohibition, illegal per se. The second contains practices which are prohibited in principle, subject to specific exceptions. The third includes optional prohibition at the discretion of the competent authorities. In practice, the control of RBP has been exercised on a mixture of basis involving strictness and flexibility rather than on a strict adherence to one of the three categories. However, national and regional legislation on the transfer of technology tend to protect wider interests relating to the economic and technological development of the recipient countries. They promised on the de facto inequality in the bargaining power of the contracting parties, and thus the state intervention in this field seeks to prevent such practices[38].

In view of the existence of significant number of RBP in licensing agreements in the developing countries[39], and for the purpose of this study, restrictive practices are divided into three categories:- (a) Territorial restrictions directly related to export; (2) Restrictions effecting the economy in general and the technological capability of the recipient countries in particular; and (3) financial restrictions.

1. EXPORT RESTRICTIONS

Territorial restrictions on exports and which are not inherent in the patent right include different types of export restrictions[40]. The effect of those restrictions on the economies of developoing

countries are of a great concern. They do not raise the export of manufactured products produced under the agreement, which may include patents, know-how, trademarks, and industrial designs. Export restrictions may be more severe when patents are combined in the same contracts with know-how. The benefits which the licensee may not derive because of such restrictions are mainly in the form of foreign exchange gains and effects on unemployment in the recipient country[41]. In India, for example, 455 agreements included one sort or another of export restriction out of 527 agreements with restrictive business practices prior to March 1964. Between April 1964 and March 1969, export restrictions were included in 161 agreements out of 171 with RBP[42]. It was also found by the Reserve Bank of India in 1974 that out of 1098 agreements, 564 included export restrictions[43].

Faced with this fact many developing countries began to enact new legislation dealing with the transfer of technology, under which the inclusion of export restriction in licensing agreement was prohibited and may render the licence invalid. In this respect, the law of Mexico is the most detailed one and leaves no doubt whatsoever to what can not be included in a licence agreement.

"..... an agreement cannot be accepted when:

It provides for the total prohibition of exports;

The licensee is denied the right to export to certain geographical areas where the licensee has not previously granted exclusive rights to third parties;

Maximum volumes are prescribed for export sales;

The licensee is required to export exclusively through the licensor on unfavourable terms;

The licensee is required unjustivably to pay a large royalty on export sales;

The licensor's prior permission is required before export transaction is carried out.

A contract even though containing export restrictions may be registered nevertheless if any of the following circumstances are present:

If the licensor has granted exclusive selling rights in other countries;

If the licensor is not authorized to grant export rights in certain areas under his country's legislation.

If only certain markets are authorized which are, however, adequate for the export capacity of the licensee.

In general, the contracts should so far as possible grant to the licensee enterprises their natural markets, specifically the markets in the American Continent"[44].

These attempts by individual developing countries to prohibit contractual restrictions on exports do not lead automatically to the right of export of the patented goods by the licensee if the patentee had taken patents for the same invention in the countries where the licensee intends to export. Otherwise the licensor would be entitled to sue the licensee for remedies against infringements, because the

validity of the patent extends solely within the boundaries of the granting country.

On the regional level, Decision 24 of the Andean Commission permits some flexibility in these areas of the law. However, such flexibility does not apply in sub-regional trade "In no case shall conditions of this kind be accepted with reference to subregional exchange or for exportation of similar products to third world countries"[45].

Export restrictions are not a right conferred by industrial property, since national patent systems unfold their effects only within the national territories, but not on the export market. Despite limitations, on the control of RBP, such as the limited bargaining power, dependence on foreign imported technology and shortage of skilled manpower in this field. It is evident that a number of developing countries in particular those of Latin America and India are taking proper action to deal with such restrictions which should inspire other developing countries to take similar actions according to their own economic circumstances[46].

2. RESTRICTIONS EFFECTING THE ECONOMY IN GENERAL AND THE TECHNOLOGICAL CAPABILITY OF THE RECIPIENT COUNTRIES

A: Restrictions on Research and Development:

The right conferred by the patent grant does in no way cover limitation on R and D of the patented product, therefore such

restrictions are usually regarded as invalid. The actual, or potential adverse effects of these practices are not difficult to visualize. They constitute a serious impediment to the competitive freedom of the recipient country. More importantly, they greatly limit the diffusion of the dynamic impact of technology on the national economy of the recipient country's ability to choose or adapt technology in accordance with local needs and resources endowments to develop the domestic infrastructure for R & D both for domestic market and for export, and to obtain access to inventions or improvement to existing technologies on reasonable terms.

Licensing agreements often contain provisions which limit the possibility of developing national technological and scientific capabilities. While these limitations exist in a wide variety of forms each varying in intensity and impact, it is possible to list them as follows:-

- restrictions on the making of improvements in the product or process by the licensee;
- restrictions forbidding the right to initiate R & D programmes in connection with new products, processes, or equipment, on the part of the licensee.
- restrictions covering the incorporation of improvements obtained from third parties.
- restrictions forbidding the licensee to initiate R & D programmes on the expiry of the license.
- conditions requiring the licensee to return drawing specifications, operating manuals, etc, on the termination of the license.

Restrictions on R & D lead to the minimization or suppression of competition in the relevant product market by preventing the licensee from exploiting the competing technology. The restriction not to undertake own research can either be total or to apply to a particular type of research activities, especially those which are in direct competition with research undertaken by the licensor. Restrictions may also be placed on adaptive research, or on the licensee's freedom to make changes in the acquired technology.

It is clear that such limitations constitute an abusive use of the licensor's dominant position, besides being undesirable in their effect on the technological progress of the recipient countries. Since one of the major objectives of patent laws is to promote domestic technological development, any limitations of this sort, either total or partial, should appropriately be prohibited in licensing agreements[47]. Furthermore, the prohibition should include all types of restrictions on the introduction of restrictions of changes in products or processes or technology obtained under the license. R & D, is the only possible way to reduce technological dependency; it is already restricted at the present time in developing countries, and should not be restricted further.

B: Grant Back Provisions:

A grant back provision in a patent license is an agreement between the licensor and the licensee, assigning to the former inventions which the latter may make in a particular technological field. Such provision establishes a unilateral flow of knowledge and

innovations for the sole benefit of the licensor which limit the licensee's ability to benefit from research activities, and could be a disincentive to the generation of local technological capability.

Grant back clauses may take several forms, each one varying in effect and scope, such forms may include:-

- reciprocal or non-reciprocal;
- exclusive or non-exclusive;
- obligatory or optional; and
- with or without any payment conditions.

Under the non reciprocal form the licensee is obliged to grant all future improvements to the licensor on a unilateral basis[48]. The licensee on the other hand, have no similar rights to information on the technological developments at the licensor's end[49].

When grant-back clauses are exclusive, this could mean either that the patentee acquires sole ownership to any improvements or inventions made by the licensee, or that the licensee is free to use inventions and improvements himself, but not free to license improvements to third parties. The effect of such clauses which are usually of an obligatory nature, is the abusive use of the patentee's dominant position and depriving the licensee of any possibility of improving his competitive position in the market through the development of new technologies and product. It also constitutes a burden on the licensee's part when such grant back clause is free of charge as the patentee is not sharing in or contributing towards the licensee financial burdens spent on R & D.

Grant back clauses are dealt with by national legislation in a wide variety of ways. In some cases certain laws do not prohibit grant back clauses in general, but only the non-reciprocal and exclusive forms[50]. There are advantages and disadvantages in grant back clauses from the point of view of the public interest. On one hand, it enables cooperative improvement or development in a particular field in the interest of the public and it is said that such clauses restrict monopoly by diluting it between producers in the field. On the other hand, it gives the licensee a good reason for not engaging in research and incentive activities since the results of such research will be turned over to the licensor or shared with him.

In certain developing countries, the position has been a prohibition of grant back provisions in principle. This is based on the recognition that all new technologies resulting from license agreements are the sole property of the licensee[51]. It should be noted that exchange of information can only make sense, when they are concluded between equal parties. Under the reciprocal form, developing countries or their enterprises should evaluate grant-back provisions from the standpoint of improving the technological capabilities and avoid the perpetuation of technological dependence. In my view, grant back clauses should be allowed in licensing agreements if they are on a reciprocal basis and non-exclusive forms in certain cases providing that they meet certain conditions set-up by the recipient countries, such as:-

- (i) That the improvements or advances which the grant back refers to, are the property of the licensee and not the licensor;

- (ii) That grant-back clauses are neither against the industrial and technological policies of the recipient country; and
- (iii) That there is a reasonable payment to the licensee on additional knowledge passed by him to the licensor, on the basis of non-exclusive, optional, reciprocal agreements, and also on the importance of the improvements.

These conditions should be adopted at least as a minimum standard for allowing grant back clauses. Even such conditions may prove to be not protecting enough, particularly when the license is concluded with large firms, since the balance between such firms and enterprises from developing countries is never equal. Such inequality between the contracting parties is the main reason for state intervention in this area. The least the state can do to protect the national economy, is to provide the legal grounds for such protection. A total prohibition of grant back clauses may not be in the interest of developing countries, since it would mean another license for the improvements reached by the licensor and which he may not grant, or be in a more powerful negotiating position. This is due to the fact that important improvements are likely to come from the licensors who have financial and skilled manpower resources to obtain them, than his contracting partner from developing countries who have shortages in either finance or skilled manpower resources as well as the low level of inventive capabilities.

C: Restriction on competing technology and products:

Such restrictions include, the prohibition to co-operate with competing firms, the patentee's right to terminate the license if the

licensee sells or produce competing goods, prior permission from the patentee before entering into licenses concerning competing technologies; obligation to pay royalties on the sale of products which are competitive with those covered by the patent license. Equally, they may include an obligation on the licensee not to produce, nor to acquire machines which are in direct competition with machines which are the subject of the licence, prohibition upon the licensee to do business in any way in the technical field which was the subject of the license, within a period of time after the termination of the license. These restrictions and others are considered to be null and invalid in most recent laws[52].

Another clause which may exist in patent licenses is the restriction upon the technology already imported. These restrictions deal with technology for which the patent protection has expired or know-how has lost its character, therefore limitation based on the further use of the product cannot be based on the industrial property system. Generally speaking the product or process which was protected by a patent which has expired shall become a subject of the general rule of law which applies to the sale and use of unpatented goods and not subject of industrial property laws.

The legal nature of know-how has not obtained legislative backing. There is no place for know-how among the classification of "property" in countries with a codified system of law. In this context Roubier wrote:-

"Considering the secret of manufacturing as a property had tempted only few writers, and it is only in a very vague manner that one can compare the infringement of the manufacturing secret as a proper infringement"[53].

French authorities seem to agree on the exclusion of a property notion in respect of know-how, which is deemed to be a matter of "appropriation de fait"[54]. The situation in common law countries does not differ substantially, the concept of property is more imprecise and flexible there[55]. In the United States the question of property right in know-how is a controversial issue. Although a large part of authors favour the non-proprietary doctrine, there is a minority which seem to admit the proprietary nature of know-how[56].

In the developing countries, the legal nature of know-how has frequently been dealt with in connection with the effects involving its transfer. The question is whether the transferred know-how can be retrieved, or whether it becomes a part of licensee's acquired knowledge. During the agreement performance, the licensee receives technical information from the licensor. It is in a sense like the knowledge gained by the nationals of the licensee (experience) which cannot be returned to the licensor[57]. The most that licensor can ask for is a clause not to disclose the know-how to third parties, since it is the communication and disclosure of technical knowledge - which was until then unknown to the recipient party - which is the basis of know-how and trade secrets.

The report of the Reserve Bank of India gave the following samples, with respect to the above restrictions:-

- (i) "The use of patents and trademarks was not generally allowed after the termination of an agreement while in some cases the Indian company had to return all the technical information and gave up manufacture of the product altogether"[58].

- (ii) ".... continuous use of the know-how after the termination of the agreement was specifically prohibited under six (of 19) agreements"[59].
- (iii) "The use of know-how supplied by the collaborator was not permitted in five (of 19) agreements after expiry"[60].
- (iv) "The use of assets after expiry of the agreement was permitted only in five (of 13) cases"[61].
- (v) "The use of patents and trademarks was not permitted after the expiry of agreements except in a few stray cases. As regarded unpatented know-how, there appeared to be a greater latitude as its use after the expiry of the agreement was specifically permitted in 47 (of 113 agreements)[62].

Later, the Indian Government, ensured that proposals for foreign collaboration should conform to the policies of the Government, under which the payment of royalty for the duration of the agreement would also constitute compensation for the use of patent rights till the expiry of the patent life and that the Indian party would be free to produce the item even after the expiry of the agreement without additional payments[63]. Closely connected with the above restrictions are other clauses relating to the prohibition of the licensee to challenge the validity of patent rights belonging to the licensor in the licensee's country[64].

3. RESTRICTION RELATING TO FINANCIAL ASPECTS

A: Package licensing occurs when the owner of patents demands that the licensee will receive a license for a group of patents regardless of whether the licensee uses all of them or only one of the patents[65]. Package licensing may also include the sale of know-how or trademarks as a condition to license the patent[66]. It is possibly true that the patentee uses the package licenses, when there is a doubt of the validity of certain patents in the package. The objective behind such package deal is to close investigations on the doubtful patents offered by other competitors, or adoption of his own improved processes or products. This type of licensing is condemned on the grounds that it prevents competitors from bidding for single patents on their individual value, and constitute an attempt to extend a monopoly of one patent to control others[67].

Package licensing is frequently used to force the recipient to accept as part of a deal a technology which he neither needs nor wants, in order to get that part of technology or trademark, or other proprietary assets which he needs. It may also be used to prolong the duration of the contract if the main patents are near to expire, but deals which include other patents have longer time to run. The situation is worse when the licensee only requires the know-how or trademarks but not patents.

The question of package licensing can only be dealt through screening procedures where competent authorities should be empowered to deny registration of contracts which are exclusive and do not

permit the license to sub-license the subject matter of the contract. Such screening procedure would be on case-by-case basis, since some of the exclusive agreements may be an incentive for the recipient country to receive new technology, to engage in expenses which are necessary to begin production and to introduce the product transferred through the technology. The effect of prohibiting the licensee to sub-license the imported technology to any third party, whether before or after the expiry of the agreement means that other firms in the same country have to acquire the same technology from the same licensor or others[68]. The case-by-case screening should also be based on the ground of the negative effect on the industrial development policies of the concerned countries. Equally, royalties on unexploited patents should be prohibited.

B: Duration of Transfer of Technology Agreement: Most technology transfer agreements contain clauses relating to the duration and obligations after the expiry of the agreement or the patent life, such as the obligation to continue royalty payments, or the obligation not to use or sub-license the technology after the expiration of the agreement.

Generally speaking, the screening authorities accept terms between 1 to 5 years. In respect of licenses involving industrial property, Argentina, Brazil, Mexico allow the respective contracts to run until the expiration of the licenses rights i.e. Mexico 10 years[69], Argentina and Brazil 15 years[70]. In cases of the Andean Pact countries, Decision 85 allows for a shorter period of 5 years, such practice is related to the reevaluation of contracts

already in force. However, in some cases the contract may run for 15 years[71]. In India collaboration agreements are normally approved for a period of five years from the date of agreement or the date of production - (commencement of production cannot be delayed beyond five years). In any event the maximum period should be 8 years from the signing of the agreement[72].

Post expiration effects of TOT agreements, have not received adequate treatment in the existing legislation. Certain issues arise from such an inadequacy, in particular with relation to the use of the transferred technology. For example, if the industrial property rights remain valid after the expiry of the agreement, in such case the licensor is legally entitled to prevent the licensee (or third party), from using the patented invention without the licensor's consent. Such legal rights means in practice that the licensee can be excluded from the market with the loss of investments already made; or negotiate from a weaker position, new conditions for continuing the license. These risks, has only been foreseen by Argentina which attempted explicitly to regulate such a situation[73], and in the adoption of "license or right" by the Andean Pact countries Decision 85 which could contribute towards avoiding those risks[74]. It is common that licensing agreements include restrictions on the use of unpatented technology after the expiry of the agreement. Such restriction is justified by the licensors on the grounds that the licensee is a mere leasee and thus obliged to return the object of the lease when the agreement expires. Despite the importance of such a restriction on the technology transferred to the developing countries, it has not yet received a full attention in national legislations[75].

C: Tie-in Restrictions: A tie in clause in a patent license is a clause obliging the licensee to obtain goods from the licensor, thus limiting the source of supply of raw materials, spare parts or intermediate product[76], creates a monopoly outside the rights conferred by the patent, the purpose of which is to achieve a monopolistic exploitation by extending the market artificially for the tied product or service. The effect of tie-in clause goes beyond the licensee to reach third parties, who are excluded by the clause from supplying the licensee and thus unable to make use of market opportunities. Such restriction tends to raise the cost of production and the over-pricing of inputs in the recipient country while it gives an additional income to the licensor.

Different attitudes have been adopted by national legislation. Some developing countries adopted legislation prohibiting tie-in clauses in principle, but allowing some exceptions to take place on technical grounds. This is because a particular technology cannot be worked without additional material input, or to guarantee the quality of product, especially if trademarks are involved or if the product is destined for export[77], suppliers and in some cases the recipient may insist on such tie in clauses.

The present state of development in most developing countries allows them to buy most of their needed material from several sources in the international market. However when they are tied to a single source, they are in fact deprived from exploiting market opportunities and become over priced, as the price is determined by a unique supplier. In the end, such a situation results in a monopoly control

over the supply of equipments and other inputs. Therefore developing countries should in principle prohibit the use of tie-in clauses with a degree of flexibility to allow for exceptional cases, where the use of such clause is in the benefit of the recipient country i.e. as in cases where there is no alternative other than to acquire the goods from the supplier of technology, or when the price is constant with that of the international market, with the right to abolish those tie-in clause, if equivalent quality inputs can be obtained at as lower price from other sources. In other words, the source of supply should always be determined by the recipient of the technology and not but its licensor.

Developing countries are particularly concerned with explicit clauses and implicit practices embodied in TOT contracts, which adversely effect the national scientific and technological capabilities of these countries. Such awareness is being demonstrated at the current negotiations of an international code of conduct on the transfer of technology, where a big gap remains between the Group of 77 on behalf of the developing countries and Group B representing the industrialized countries.

2. The UNCTAD's Code of Conduct on the Transfer of Technology:

UNCTAD was the first international organization almost entirely devoted to the economic, trade and development problems of the developing countries. In 1973, the UNCTAD's Trade and Development Board adopted Resolution 104 (XIII) requesting the Intergovernment Group on the Transfer of Technology to study the possibility and the

feasibility on an international code of conduct in the field of the transfer of technology, and asked the Secretary General of UNCTAD to prepare the necessary background papers for this work[79]. The negotiations of the code is one of the key initiatives associated with the establishment of the New International Economic Order (NIEO), and as such, it is being regarded by UNCTAD as a landmark in its work[80].

The UNCTAD's work in the field of the transfer of technology has a dual purpose: the revision of the Paris Convention and the formulation of an international code of conduct on the transfer of technology.

(A) As far as patents are concerned, the UNCTAD drive to achieve effective reform in the field of industrial property by revising the existing international patent law - the revision of the Paris Convention - which is binding on 85 countries throughout the world[81] has been relatively successful. It has been successful not because an actual revision of the Convention has been achieved yet[82], accommodating the needs of the developing countries, but rather because of the considerable attention which the UNCTAD report DT/B/C.11/19 (1974) has attracted and the anxieties which it caused among the industrialized countries.

The report seeks to substantiate the view that the present international patent system is tailored solely to accommodate the interest of the industrialized countries in a very one sided way. Even patents granted by the developing countries are overwhelmingly in

the hands of foreign patentees, who often use their patents as import licenses, a situation which cannot be improved by revocation and compulsory licensing.

The UNCTAD report continues to suggest that the transfer of technology only takes place when patents are being worked. However, the cost of such transfer is far too high as a result of high licenses fees, restrictive practices and hidden cost in the form of excessive prices for imported equipments and technical assistance. Because of these reasons, the report raises the question of the treatment of nationals and foreigners as one of the utmost importance in the revision of the Paris Convention.

Since 1975, a group of governmental experts have been working on a list compiled by experts from the developing countries[83]. Among other things, the list raises the question, for example, of whether or not the developing countries: should be conceded to charge higher patent fees from non nationals than from nationals, whether non-nationals should be granted shorter protection or even a limited protection, and whether stricter obligations to work patents can be imposed on foreigners[84].

The patent system could - according to various UNCTAD documents and investigations - if properly designed, contribute towards the creation of favourable environment. But as the system exists in developing countries it has by and large failed to contribute either to stimulate inventions among nationals, or encourage rapid transfer and widespread diffusion of knowledge. The low industrial level and

the technological structure meant that enterprises from the developing countries were placed in a highly vulnerable position when negotiating TOT contracts with foreign firms. Patents and other forms of industrial property can only benefit the developing countries, if the technical knowledge contained in those patents is put to an effective use through local production facilities. However, one should not over-estimate the significance of the patent system to the technological development of the developing countries. The transfer of technology is only one of many factors, and the question of patents is not decisive in itself, indeed the developing countries need more than the patented technology.

(B) The idea of an international Code of Conduct on the Transfer of Technology - as previously mentioned - is only one part of the efforts made by the developing countries to construct a New International Economic Order, and to restructure the political, economical and legal systems in order to further their economic development and political autonomy. As far as one can tell from existing drafts, the planned code will contain a new and very far reaching approach to governing economic relationship between developing and developed countries. The present draft of the Code of Conduct on Transfer of Technology^[85], which is divided into ten chapters, is exceptionally detailed and more like a national legislation than an international convention. This is because of the fact that the developing countries wanted a legally binding treaty embodying genuine obligations.

A long list of outstanding issues representing the position of the Group of 77 during the negotiation of the Code can be summarised as follows:

First, the developing countries insist that the Code must be legally binding "an internationally legally binding instrument is the only form capable of effectively regulating the transfer of technology"[86];

Second, the Code must apply to all international transactions concerning the transfer of technology and not only transfers accross national boundaries, but also to boundaries within national boundaries if a foreign entity is directly or indirectly involved[87];

Third, the Code must apply the law of the acquiring party to matters relating to public policy and to sovereignty[88];

Fourth, the Code must provide that in the settlement of disputes "the courts and other tribunals of the technology acquiring country shall have jurisdiction over disputes arising from the conditions or the effects of the contract which concern public policy or sovereignty or conflict or characterization"[89];

Fifth, the practices listed under the chapter on restrictive practices[90] shall be considered as being merely examples of adverse practices and not as an exhaustive enumeration of such practices[91];

Sixth, the Code must eliminate all restrictive business practices, whether anti-competitive or not, which adversely effect the social, economic or technological development of the recipient countries[92], and

Seventh, in order to implement effectively the code, the group of 77 proposed the creation of an international body within UNCTAD "which shall among other functions, make appropriate recommendations to states on the implementation and application of the Code[93].

The purpose of the Code of Conduct on the Transfer of Technology is to improve the flow of technology, to enable developing countries to obtain technology on terms more conducive to their economic development, and to make TOT transactions more free of unfair practices. Most importantly, the Code is hoped to give the developing countries the chance to regulate what is recongized to be as the heretofore unchecked power of MNCs.

The agreement on an International Code of Conduct has not yet been reached because of the unresolved issues. Two of those issues concern the legal character of the Code and the applicable law.

Arguments over the legal character of the Code in international law show the divergence of views among the three regional groups. The Group of 77 has never supposed that the Code could be anything but a legally binding, meanwhile, Group B has never stated that it would accept anything but a non-binding Code. The position of Group D - (socialist countries) - on the judicial character of the Code, slowly approached that of the Group of 77, and thus by the end of 1970's it became two Groups argument on the idea of a non-binding instrument[94].

Since the beginning of the negotiations on the Code, there had been no lack of moral initiatives and support, which certainly helped to draw attention to the problems of TOT. However, only the law could deal with those problems and organize relationships between countries. Therefore, what is needed is not a code of moral principles, but a binding legal code applicable to all the parties to an agreement for the transfer of technology.

The position of Group B is that the code should be a non-binding legal instrument. The Group points out that a code in the form of guidelines would have such a profound impact that its provisions would be broadly applied, and would not preclude the possibility of appropriate action at a later stage^[95]. On the other hand developing countries maintain that only the adoption of a legally binding instrument would ensure that its objectives are in fact realized^[96]. Furthermore, developing countries went on to suggest that if the Code which covers many aspects of the transfer of technology was acceptable only in the form of guidelines, why a similar approach had not been adopted to the revision of the Paris Convention. Moreover, since patents are the basic element in the TOT, would it not be better to revise the Convention and transfer it, too, into a set of guidelines^[97].

The comparison between the legal Charter of the Paris Convention for the Protection of Industrial Property and the future Code of Conduct on the Transfer of Technology was not fully exploited during the ongoing negotiations by the developing countries. One should bear in mind that developed and developing countries generally have followed two different approaches in regulating the transfer of technology. The developing countries legislations usually seek to limit the activities of MNCs, by regulating their control over the terms of TOT contracts. On the other hand, developed countries legislations tend to protect the technical and industrial property rights of MNCs and promote their activities. It might be just possible that if the industrialized countries were faced with two options: either to accept a legal character of the code, or to see

developing countries attempting to abolish the patent system or keep it merely as a guideline^[98], would go for the first option. After all the developing countries would not lose much by following such a line.

To adopt the Code as a mere guideline is, to a certain extent, to endorse the status quo without meeting the fundamental needs of the developing countries. A set of guidelines, means that the "Anglo Saxon" orientation of "fair and reasonable" would have to be accepted by the developing countries. Such concept does not exist in Roman law on which the legislation of many of the developing countries is based - (i.e. French speaking countries of Africa and Latin America). Thus, what they want is a code that states precisely what is fair and reasonable as to remove all grounds for controversy. In an age of multinational corporations, which were often more powerful than many states, developing countries feel that a code based on vague concept of fair and reasonable might fail to meet the problems encountered.

To solve the differing perceptions of the legal nature of the Code, the UNCTAD Secretariat advanced its own combination of alternatives and possible solutions to the issue^[99]. For example, it proposed the adoption of the Code as a set of guidelines in the form of a U.N. resolution and, subsequent to such adoption, the Code may be opened for accession as a treaty by States. Another alternative was the adoption of the Code as a convention containing both mandatory and voluntary provisions in all chapters.

It is unlikely at present that the developed countries are prepared to accept a legally binding Code and seems more likely that

a two step approach will finally be adopted. The first step would consist of adopting the code as a U.N. resolution, and the second is to decide the legal character of the code at a review conference to be held within a fixed time-frame. This compromise solution can be interpreted that the industrialized countries have undertaken now to accept a legally binding code at the next revision if the code is shown to be unsatisfactory as a non-binding instrument.

One of the liveliest question at the ongoing negotiations concerns the applicable law to the settlement of disputes arising from TOT contracts. Once again, the disagreement on this issue^[100] has been reduced to the two opposing regional Groups namely the Group of 77 and Group B. The Group D widely recognizes the will of the parties to choose the applicable law within the permitted limits of national legislation. Such position can be seen as a tacit agreement with the point of view of Group B.

The position of the industrialized countries - (Group B) - is essentially that:

"The parties to a technology transfer agreement may freely choose the law governing the formation, the validity, performance and interpretation of the agreement, provided that the law chosen either has a substantial relationship to the or to the transaction or there is other reasonable basis for the parties' choice"^[101].

In other terms, the Group B desires that the choice of the applicable law be possible between the law of the country of the technology

supplier and that of the recipient state. Furthermore, and in cases where no effective law was chosen by the parties, the substantive law of the country having the closest and most real connection with the agreement should govern such an agreement[102]. Apart from the freedom to choose the applicable law, the parties should also be free to choose the court before which disputes shall be tried, and arbitration or any third party procedures[103]. The Eastern Block - (Group D) - consider arbitration as one of the most suitable methods of settling disputes, to the extent of excluding the jurisdiction of the ordinary courts[104].

By contrast, the Group of 77 maintain that the recipient of the technology should unequivocally hold jurisdiction.

"The law application to matters relating to public policy (ordre public) and to sovereignty shall be the law of the acquiring country. Any clause to the contrary shall be void"[105].

The same law of the recipient country should apply to any contractual clause which might violate the public policy and sovereignty of that country especially in matters concerning its governmental prerogative or its legislative, regulatory or administrative powers. Equally the jurisdiction over disputes arising from the conditions or the effect of the contract and which concern public policy or sovereignty, shall be that of the recipient country's courts and tribunals[106].

The freedom of the contracting parties, can be permitted in matters of the applicable law providing that conflict does not involve

questions of public policy and sovereignty[107]. The parties can also choose to opt for arbitration or a forum in matters of private interest so long as choice does not contain clauses which explicitly or implicitly excludes the jurisdiction of the courts and tribunals of the recipient country[108]; and providing that the recipient country has express rules to the contrary[109].

The question of applicable law had sown real panic among the technology suppliers, especially MNCs, which feared having to submit to the legislation of the developing countries. The legal nature and possible form of the code is directly linked with issue of the applicable law. In other terms, if the code is to take the form of a non-binding character, the question of applicable law would be limited to set of guidelines on the subject. On the other hand, if the code is to take the form of a legally-binding character, the main substantive applicable legal provisions would be the rules contained in the code itself.

The nature of dispute can be indicated by the fact that the developing countries, relying on the Calvo doctrine by which the law of the acquiring country applies to disputes and the industrialized countries rejecting such approach. The latter believe that the applicable law or the proper law of the contract should be freely expressed by the parties, i.e. a specific national law[110]. However, the developing countries argue that the law of the acquiring country proposed by them is in fact favoured by many industrialized countries, which applied it in various forms, such as the law having the closest link with the contract. Further to accept the choice of

the parties, amounts to endorsing existing practices and thus give the technology suppliers the whip hand, since the freedom to choose means in fact the choice of the most powerful party.

As far as arbitration is concerned as a means of solving disputes arising from TOT contracts, it has often worked against the developing countries. For example, in the Abu Dhabi Arbitration, Lord Asquith of Bishopstone conceded that "if any municipal system were applicable, it would prima facie be that of Abu Dhabi" but the arbitrator rejected such law on the basis that "it was fanciful to suggest that in this very primitive region, there was any settled body of law of legal principles applicable to the construction of modern commercial instrument"[111]. Likewise, Sir Alfred Backnill ruled out Islamic law as the proper law despite finding it to be the appropriate law[112]. Furthermore, arbitral awards have been criticized in the industrialized countries themselves, such as the one in the ARMACO Arbitration[113], and more recently in the arbitration between Libya and American Oil Companies[114].

Arbitration in itself is not held in question, but in the light of the de facto inequalities which exist, it is essential that precaution be taken in the cases of contracts between companies from developed and developing countries. Arbitration procedures which were employed almost excessively in Anglo-Saxon countries in the early 19th century, gradually extended to European countries and became organized as international trade expanded. The interests of the parties were similar, it could be said that the parties constituted a veritable

international society of buyers and sellers. Then the industrialized nations achieved their desire to possess their own jurisdiction by the setting-up of arbitration bodies, thereby themselves determining the procedures employed for settling their differences.

However, international trade is expanding rapidly, in such a way that we have entered a new phase. The nature of contracts has changed in respect of the legal status of the parties and in respect of the content of contracts. The contracts are no longer merely commercial in the traditional sense of the term, their scope has expanded to include a variety of services. Trade does not involve the industrialized countries - the founders of the arbitration club, but also the developing countries who import finished goods and industrial units and export their natural resources.

At present the developing countries are still confined to these systems of arbitration, therefore it is perfectly legitimate for them to seek the up-dating of these systems by placing greater emphasis on the ultimate purpose of the contract.

Arbitrators and judges belonging as they do to a certain part of the world and certain social system, have a conception of the law which cannot but reflect their own system. Accordingly they tend to consider the arguments of the developing countries as being devoid of any legal grounds and inoperative when such argument do not fit in with their own conception of law.

The denationalization or delocalization of settlement of disputes means the separation of contracts from any state law runs counter to

the most classical concept of sovereignty. It is in this context, that the latin American countries have asserted the sovereignty aspect in their laws and regulations concerning the transfer of technology. These laws have provided that the national law should govern the interpretation and performance of technology contracts[115], and established the principle of national jurisdiction over disputes arising from TOT agreements[116].

Based on the Algerian experience, it is doubtful whether having the national law as the proper law of the contract without national jurisdiction over disputes arising from technology contracts could guarantee the public policy and sovereignty aspects. M. ISSAD argued that the optimism raised by the frequent recourse by the national enterprises to the Algerian law is being tempered by the frequent recourse to international arbitration[117]. The reasons behind M. ISSAD argument is that the Algerian law of obligations is not fundamentally different from similar European laws, in particular the French civil code[118]. Furthermore, technology contracts are not limited to the two contracting parties: national enterprises and foreign firms, but like most companies from the developing countries, the practice of binding credits efficiently assure the foreign constructor or the seller of technology of the intervention of banks, and thus transforming the contract from two contracting parties to three or more. The effect of this transformation is that banks and sometimes countries arrogate to themselves the right to introduce between the company or the country concerned and those who are not parties to the contract and to admonish them in schoolmastery fashion.

Finally, this argument is further enhanced by the lack of coherence between the payment of the contracts price and the execution of the services by the foreign contracting parties. For example, in one of the contracts for the realization of an industrial plant signed by Algeria, the payment of the contract's price was scheduled as follows:-

- 5% as initial payment within one month of the entry into force of the contract;
- 1% one month after the initial payments; then payments continue each two or three months.
- The final fraction of 0.5% must be paid six months before the expiry of the duration of the contract, which was fixed in this particular contract at 54 months.

There was no clause tying the payments to the actual performance and execution of the contract's rights and obligations. To make things worse, the foreign contracting firm abandoned the work yard but had already been paid a substantial proportion of the contract's value. In situation like this, even when arbitration awards are pronounced against the foreign constructor they do not result in fair compensation for the prejudice suffered by the national enterprises.

The attitude of the industrialized countries with regard to the proper law of the contract and arbitration appears to be based on the notion of "civilized nations", which alone have the capacity, and other legal systems are regarded as a "legal vacuum"[119]. Thus, they consider such regimes as highly dubious systems of law which are scarcely suited to the task of dealing satisfactorily with the legal

issues involved in complicated international trade transactions. It is hard to understand the contradictions embodied in the proposals of the industrialized nations. On one hand they did all they can to deny a binding legal character to the code, and on the other hand, they maintained that the developing countries should regulate technology within the framework of the applicable provisions of international law. The logic requires that the code should become part of international law if its provisions were to be adopted by the developing countries.

Finally, it seems that the Code will follow the steps of the "Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices", [120], and will be submitted for adoption by consensus as a General Assembly resolution. The non-binding status of the Code it means that it can only play the role of: (i) a model to individual states for national legislation; and (ii) recommendations to states and parties to technology transfer contracts. As such it is possible that many developing countries will adopt the principles embodied in the code, while the laws of the technology supplying countries will less likely to be consistent with the Code.

NOTES

[1] Resolution 1713 was the result of a draft submitted by Bolivia and Brazil to the General Assembly of the United Nations in 1961.

[2] Other motives governing the proliferation of MNCs when deciding to invest abroad may include: (i) the fear that their present or prospective market will be lost to foreign or local competitors; (ii) the possibility of lower production cost which makes it cheaper to produce components; (iii) the desire to avoid home country's regulations.

[3] Management, technical assistance, equipment and machinery and engineering contracts are discussed in details in Chapters 5 and 6.

[4] "The basic economic calculus of commercial technology suppliers must be the economic return on their proprietary knowledge, whether they are corporate investors, licensors or equipment suppliers. They will be motivated to adapt or innovate only if the market or potential market is large enough and hence profitable enough to warrant such action". DESA (1972) "Transfer of operative technology at the enterprise level" UN DOC.ST/ECA/151 p10, see also S. LALL (1976) "The patent system and the transfer of technology to less developed countries" Journal of World Trade Law, Vol. 10, p5.

[5] Report of the Secretary General of the United Nations (1964) "The role of patents in the transfer of technology to under-developed countries" Document E/3861/Rev.1.

[6] See UNCTAD "Selected Principal Provisions in National Laws, Regulations and Policy Guidelines" TD/B/C.6/AC.1/2/Supp.1/Add.a/1975, which list laws and regulations on TOT from several selected countries including Argentina, Brazil, Colombia, France, West Germany, India, Mexico, Nigeria, Romania, Spain, U.K., U.S. and Yugoslavia. Also included are the regional regulations for the Andean Pact, EEC and DECD.

[7] UNCTAD "Report of the Intergovernmental Group of Experts on a Code of Conduct on Transfer of Technology" TD/B/C.6/1 Geneva, May 1975.

[8] The Brazilian law 4131 of 1962 (amended by law 4390 of 1964) on foreign investment was the first law which systematically dealt with payments for foreign technology. The major innovation of that law was the prohibition of a subsidiary from paying royalties on patents and trademarks licenses to its parent company, as well as the introduction of rules concerning the registration of agreements.

[9] Decree No. 1272 (1961) Articles 20, 30 and 40.

[10] See UNCTAD "Control of Restrictive Business Practices in Latin America" Doc ST/MD/4 (1975) p.86, and Doc.ST/MD/4/Add.1.

[11] Andean Commission, Decision 24 "Standard Regimes for Treatment of Foreign Capital and for Treatment of Trademarks, Patents Licenses and Royalties", December 31, 1970; for the adoption of Decision 24, see LYNN MYTELKA (1977) "Regulating direct foreign investment and transfer

of technology in the Andean Group" Journal of Peace Research Vol. XIV No. 2 pp138-161; UNCTAD "Policies relating to the transfer of technology of the countries of the Andean Pact: their foundation" TD 107 (29 December 1971), and International Legal Materials Vol. 11 (1972) p126.

[12] Decree no. 444 (1967), Article 102 as amended by Article 6 of the Decree no. 688 (1967).

[13] The nine countries who have adopted legislation concerning the regulation of TOT in Latin America up to 1980 are: The Andean Pact countries (Chile, Bolivia, Peru, Colombia, Ecuador and Venezuela which acceded to the Pact in 1973), Chile on the other hand withdrew from the Pact in 1976, and later denounced most of the provisions of the Agreement. The pivot of the treaty of 1969 forming the Pact and the cause of internal dissensions was Decision 24 which adopted a common policy vis-a-vis the activities of foreign firms operating in the member countries and suppliers of technology, see RENE FRANCOIS BIZEC (1981) "les transferts de Technologies" P.U.F. [QUE. SAIS. JE] p109. The other countries are Argentina, Brazil and Mexico.

[14] Lynn Mytelka op cit p156. However, there are those who argue that governmental interference with commercial activities results in decreased business, decreased return on capital and lower level of efficiency. Nevertheless the developing countries maintain that there is no incapability between promoting TOT and applying regulatory measures. They point out to Articles 85 and 86 of the Treaty of Rome and the U.S. Anti-trust laws, see UNCTAD supra note 7, p22.

[15] See in particular the Colombian Decree 1234 of 1972, Argentina's law no. 20794 and 19231, and Mexico's law of 1972 concerning the transfer of technology.

[16] The authorization and registration of contracts is mandatory under Decision 24 Articles 6(F) and 18, Argentina law no. 19231, Art. 2; Brazil law no. 4131 Articles 3 and 9, Mexico law on TOT (1972) Articles 1, 2, and 4.

[17] Article 6 of the 1972 law on TOT. Although Decision 24 provides no measure for ensuring the registration of contracts, national legislation of the member states provides for registration as a prerequisite for remittances abroad. See, CHILE: CENTRAL BANK Circular no. 1932 (1972) art. 9, Colombia: Decree 1234 (1972) and Decree 688 Art. 6 amending Article 102 of Decree 444. Peru: Supreme Decree no. 001-71-IC-DC/71 Arts. 51 and 52 and the Legislative Decree no. 18999 Art. 2(b), Venezuela Decree no. 68 (28 April 1974) Arts. 55, 59 and 63, and Decree no. 746 (February 11, 1975) concerns the registration contracts on TOT.

According to the Argentinian law no. 19231 Art. 5, failure to register contracts render them invalid with no right of enforcement in the courts and no remittances abroad is allowed Art. 12. Under the Brazilian law no. 4131, Art. 9, registration with the Central Bank is a must if foreign remittances are to be made, and compulsory when the contract relates to industrial property. Law 5772 Art. 30 establishing INPI and Normative Act. 015/1975 Art. 1.

[18] See Annex 3:1 for the different machineries set-up by Latin American countries legislations.

[19] See Annex 3:2 of actual personnel employed in these machineries.

[20] To acquire such status, the applicant must be "foreign individuals with uninterrupted residence in the recipient country of not less than one year..." Decision 24, Art. 1.

[21] In Brazil for example, a total of 6503 contracts were authorized by the INPI between 1972-1976, representing an average of 1300 contracts per annum. Between 1972-1974, a total of 4968 contracts were evaluated or an average of 1656 per annum. In Argentina, the number of authorized agreements between 1972-1979, reached 3150 contracts, more than half of which was in 1972 (1706 contracts), because the figure includes all agreements (existing and new), at the time when law 19231 came into force see, UNCTAD "The implementation of transfer of technology regulations. A preliminary analysis of the experience of Latin America, India and the Philippines" TD/B/C.6/55 (1980) table 2, p.9.

[22] See Brazil's law no. 5772, Andean Pact Decision 85 "Decision on Industrial Property" 1974, and other laws in the previous chapter 2.

[23] India has chosen to develop as a mixed economy, permitting both private and public sectors to assist in the country's development, with the public sector being given the major role in the development process. The need for private investment was recognized by the Industrial Policy Resolution of 1948 as exceptional. Accordingly, a demarcation of industrial fields was initiated between private and

public sectors, dividing industrial sectors into three categories: (1) the first category is reserved for public ownership (i.e. energy, railways, arms), (2) the second category include industries in which all new undertakings would be established exclusively by the public sector (i.e. iron and steel; coal, shipbuilding, aircraft, communication), and (3) the last category was left to the private sector with the right of the state to acquire any industry (i.e. pharmaceuticals).

[24] In 1954, a socialist pattern of the society was accepted by the Government as the ultimate goal, which gave a definite shape to the economic and social ideology, and required a change to alter the pattern of mixed economy.

[25] The 1956 Industrial Policy Resolution classifies industries into three categories on the basis of their current and future right of ownership and on the basis of the role of Government in each category: Category A; includes 17 industries in which the public sector will have the exclusive responsibility for future development;

Category B; lists 12 industries which will be progressively state owned, and in which the state takes the initiative in establishing new undertaking, but in which the private sector will also be expected to supplement the efforts of the state;

Category C; does not specify any particular industry, but states that all industries not included in categories A and B will be left to the initiative of the private sector.

[26] Since 1969, the Indian Government applied the following principles to foreign technology importation:

- where the technology is locally available, it must be preferred to the foreign one; if the technology is not available in India, it must be imported at the lowest possible price.
- Once the transfer takes place, the technology becomes Indian. It should not be paid for beyond a 5 year period, and its use must be preferred to the import of similar technology.
- As a general rule, foreign capital participation in new joint ventures should be no more than 40 per cent.

[27] Authorities involved in the evaluation and registration of contracts before their approval by the Foreign Investment Board which is headed by the Department of Economic Affairs and include senior officials of the Ministries of Industrial Development, Company Affairs, the Directorate General of Technical Development, The Department of Science and Technology, The Council of Scientific and Industrial Research, and the Planning Commission.

[28] The National Council of Applied Economic Research (1971) "Foreign Technology and Investment: A Study of their Role in India's Industrialization" June, Appendix 1, p.155.

[29] The restrictions on the private sector were strengthened by the announcement of a new industrial policy in February 1970, which divided the industrial sectors into:

- (i) a core sector consisting of basic, critical and strategic industries;

(ii) a heavy investment sector, which in fact a sub-sector of the core sector, and where all new investment proposition exceeding Rs.50 million are treated as falling within this sector;

(iii) a middle sector in which both private and public capital can operate jointly; and

(iv) a reserved sector for private investment, which mainly includes consumer goods industries.

[30] A de-licensing system was introduced for undertakings with an investment up to Rs.10 million. The system also applied to undertakings between Rs.10 million and Rs.50 million if the following requirements are met:

(a) do not require marginal assistance by way of foreign exchange of capital equipment and where no more than 10% of total capital value or Rs.1 million whichever was less by ways of foreign exchange for imports;

(b) firms which are not "dominant" undertakings as defined by the Monopolies and Restrictive Trade Practices Act "MPTPA" of 1969, Government of India, Planning Commission "The Fourth Five Year Plan (1969-1874)" June 1970.

[31] UNCTAD "Selected principal provisions in national laws, regulations and policy guidelines" TD/B/C.6/Ac.1/2/Supp.1/Add.1 (1975) pp92-99.

[32] Exceptional cases where foreign equity is allowed beyond the 40 per cent limit are:

- 100% equity ownership by foreigners in cases wehre 100% of the output is for export,

- 74% for companies engaged in priorities sectors, such as oil exploration, where high technology is involved, and for foreign companies exporting more than 75% of their output.
- 60% for companies exporting between 60% and 75% of their output.
- 51% for companies exporting between 40% and 60% of their output.

[33] See for example, the Nigerian Patents and Designs Decree of 1970, section 23 (3):

"Any clause in a contract for a license ... is null in so far as it imposes on the licensee in the industrial or commercial field restrictions which do not derive from the rights conferred by the relevant patent or design or are necessary for the safeguarding of these rights".

[34] OECD (1972) "Restrictive Business Practices relating to Patents and licenses" Report by the Committee of Experts on Restrictive Business Practices, Paris.

[35] Except in countries where importing is excluded from the patentee privilege.

[36] Irrespective of whether licensing agreements or investment contracts are involved, containing clauses restricting export to certain countries where the patentee has obtained patents, the export of the patented product automatically require prior approval of the patent holder. See UNCTAD "Restrictive Business Practices" TD/122 (22 December 1971) para.16.

[37] MELVILLE expanded the basic test of common law to the following: (i) a man is entitled to make his own selection of suppliers of goods not covered by the licensor's patent; (ii) a man should be free to take licenses only in those patents he uses, (iii) invalid patents should not be enforced to make a conclusive agreement; and (iv) patents not be used in combination or concentration in a manner likely to produce exclusively high profits, L. W. MELVILLE (1972) "Precedents on Intellectual Property and International Licensing" Sweet and Maxwell 2nd edition p8.

[38] In the statement of motives that accompanies the Mexican Law on TOT of 1972, it stated that "the purpose of this law is to eliminate obstacles to Mexico's development and foreign trade, to adjust technology contracts to the guidelines of the Government's industrialization policy and to stimulate the creation of local scientific and technological infrastructure that permits the adaptation of foreign technology to the conditions and needs of the Mexican economy" TD/B/C.6/55 op cit. note 68.

[39] A fairly comprehensive list of RBP may be found in the following UNCTAD documents: UNCTAD TD/B/AC.11/19 (1974) op cit; "Major issues arising from the transport of technology to developing countries" TD/B/AC.11/10/Rev. 1; "Control of Restrictive Business Practices in Latin America" UNCTAD ST/MD/4 (1975); "Major issues arising from the transfer of technology: A case study of Chile" UNCTAD TD/B/AC.11/20 (1974); "Restrictions on Exports in Foreign Collaborations Agreements in the Republic of the Philippines" TD/B/388.

[40] The following types of restrictions may be identified in TOT agreements:

- (a) Export allowed to certain countries only;
- (b) Export prohibited to certain countries only;
- (c) Export allowed only through the licensors agents;
- (d) Prior approval before the patented product can be exported;
- (e) Total ban on exports;
- (f) Price control of exports; and
- (g) Export quotas.

[41] In the Philippines, 82 agreements included restrictions out of 126 agreements in 1970, or 65% of the total. This figure was reduced to 25% or 31 agreements out of 124 in 1980, see UNCTAD "Restrictive Business Practices" TD/B/C.2/104 (19 January 1971) table 2:3 p48; and "Transfer of Technology Regulations in the Philippines" TD/TT/32 (1980) pp24-25.

[42] Reserve Bank of India Bulletin (1968) "Foreign collaborations in Indian Industry: A Survey Report"; UNCTAD TD/B/C.2/104 op cit. table 2:2.

[43] Reserve Bank of India Bulletin: Survey Report (1974) p1071.

[44] Mexico's Law of 28/12/1972 concerning the registration of the transfer of technology and the use and working of patents, trade names and trademawrks, Art. 7 (VII). See also, Argentina's law 21617 (1977) Article (c), Brazil's law 5772 (1971) Art. 29(2) and 90(2), Normative Act 015 (1975) Articles 2.5.2(b)(i); 3.5.2.(c)(i), 4.5.2.(d)(1) and

5.5.2.(d)(i); India; The Monopolies and Restrictive Trade Practices Act (1969) Art.33(i)(G), Guidelines for Industries (1976-77) Chapter 3.9(V), Portugal, Legislative Decree No. 239 Code of Foreign Investment of 6.4.1976 Art. 28, and Spains Ministry of Industry Order of 5.12.73 regulating the entry of contracts for TOT in the register established by decree no. 2343 of 21 Sept. 1973 section 3(5).

[45] Decision 24 op cit Articles 20 and 25(a).

[46] Restrictions on export in a restraint on either exports or imports under the Sherman Act of 2.7.1890 Section 1 to 3 in the United States. In the EEC, the commission takes the view that export prohibition between EEC countries with regards to patented products are within the scope of Article 85(1) of the Rome Treaty, even if the licensor owns a possible patent covering product in country to which the export is prevented. See the official Journal of the EEC. L.G., 13.1.1976 under which the commission stated its own view on clauses restricting exports.

[47] Restrictions on R & D are prohibited under the Argentinian Law 21617 (1977) Art 10 (1); Brazil's Normative Act 015 (1975) Arts 2.5.2. (b) (iv), 3.5.22(c)(iii), 4.5.2.(d)(iv) and 5.5.2.(d)(iv); India's Guidelines for Industries (1976-77), Chapter III, para 9, item (viii). Item (vii) went further to acquire entrepreneurs that agreements: "There should also be adequate arrangements for research and development, engineering design, training of technological personnel and other measures for the adsorption, adaptation and development of the imported technology". Mexico law of 28.12.72 Art 7(v); Spain Ministry of Industry Order of 5.12.73.

[48] Non-reciprocal grant back clauses are prohibited under the Argentinian law 21617 (1977) Art. 10(e), Brazilian law 5772, Art. 29(3), Normative Act 015, Art. 2.5.1.(d), Mexico law 28.12.72, Art. 7(iv) and summary of the general criteria for its application issued by the National Register of TOT agreements.

[49] Under the EEC rules, a grant back is not considered a restrictive clause, provided the undertakings are not exclusive and the licensor has entered into similar undertakings. Grant back clauses are unobjectionable under the following three conditions:-

1. That there is a reciprocal undertaking by the licensor to license the licensee in respect of improvements;
2. That they provide only for non-exclusive license of improvements to the licensor; and
3. That they are limited to experience gained in the use of the patented products or related to inventions by the licensee in the field of improvements or application of the patented invention EEC "Notice on Patent Licensing Agreements", official Journal of the European Community No. 139 (27 December 1962).

[50] The Argentinian Law 21617, Art. 10(e) allows for reciprocal grant back clauses; the Brazilian laws insist that the license should specify that the licensee owns all the rights to improvements or advances incorporated by him, which implies the prohibition of non-reciprocal and exclusive grant-back clauses, (as in note 31 op cit). Other national legislation generally prohibit the inclusion of such clauses, Portugal Decree 239 (1976) Art 28(b), and Andean Group Decision 24 (incorporated by the member countries) Art. 20(F). In

other cases like the United States, no general answer can be given to the problem of grant back clauses. Agreements inhabiting such clauses are not necessarily invalid but depend on the mode of operation and on the particular circumstances (i.e. the narrowness or breadth of the field concerned, the distinction between "developments" and "improvements"; the market power of the licensor, exclusive or non-exclusive grant-back, the duration of the licence, the importance of the improvements and the effect on competition. The rule is that grant back clauses are not invalid if they operate to encourage invention and that improvements are made available on reasonable terms without discrimination. However, clauses with the intention of putting the licensor in a dominant position and are used to lesser competition are considered invalid. See L. W. Melville "Precedent on Intellectual Property and International Licensing (London, Sweet and Maxwell 1972 p21, see also "the effect of the US and EEC antitrust law on International licensing into developing countries". Report prepared by M. B. Finnigan, Consultant to the UNIDO (ID/WG.131/4) 11 July 1972.

[51] See laws of developing countries cited in note 47 and 50 op cit, and Venezuela's Decree 746 (1975) Article 1(J).

[52] See Argentina Law 21617 (1977) Art. 10(n), India Patent Law Act 1970, Art. 140(i)iii(c), Monopolies and Restrictive Trade Practices Act (1969) Art. 33(i)(c)(H). Mexico Law 28.12.1972, Art. 7(viii). Under Decision 24 it was simply stated that member states shall not authorize TOT agreements or patents "(d) prohibiting the use of competing technology", Art 20(d). In the United States a distinction is made on whether the license is exclusive or not. If the patent

license was an exclusive one, and the patentee's only payment is royalty on sales, no competing technologies clause may be accepted. On the other hand, if the license was non-exclusive such restrictions are invalid and constitute a patent misuse.

[53] Roubier (1954) "Le Droit de la propriete industrielle" Tome II, Recueil SINEY, Paris p371.

[54] MAGNIN, F. (1974) "Know-how et propriete industrielle" Librairies Techniques p246.

[55] Ibid p249.

[56] DESSEMONTEF. F. (1974) "Le Savoire-faire industriel, definition et protection du know-how en droit Americain" Librairie DROZ Geneve p271.

[57] According to DEMIN the transfer of know-how "is neither a "lease" nor "concession" d'un bien mobilier nor a "license" "assignment" or "sale". DEMIN, P. (1968) "Le contrat de know-how" Ed. Bruy Lant, Bruxelles pl93.

[58] 1968 Report of the Reserve Bank of India. Restrictions of such type were found in majority participation in the transport equipment agreements p36.

[59] Ibid pp37-38, in majority capital participation electrical goods and machinery agreements.

[60] Ibid p38, in majority capital participation - medicines and pharmaceuticals agreements.

[61] Ibid p66. In majority capital participation in other chemicals agreements.

[62] Ibid p87 in pure technical collaboration agreements in machinery and machine tools reproduced in TD/B/C.2/104 op cit. p51.

[63] India Guidelines for Industries (1976-77) Chapter III para 9(ix), and (ii); Brazil Normative Act 015/75 Art. 4.5.2.(d)(vi), Art. 6.5.2.(b), Art. 5.5.2.(d)(vi), and 4.5.2.(d)(vi); Venezuela Decree 746 (1975) Art. 1(a), (b), (c).

[64] See UNCTAD TD/B/388 and TT/32.

[65] Brazils Normative Act 015/75 Articles 2.5.2.(b)(v), 3.5.2.(c)(iv), 4.5.2.(d)(v), and 5.5.2.(d)(v).

[66] In the United States a distinction is made on whether package licensing was voluntary or compulsory. There is no illegality per se if there is no refusal to a request for less than the package. If the licensee can prove, that the package was forced upon him as in the Automatic Radio MFG case, where the defendant had accumulated 570 patents relating to radio broadcasting apparatus and was in the practise for licensing and all responsible manufacturers at a royalty based on a small percentage of net sales. Automatic Radio FMG v. HAZELTINE RESEARCH INC; 339 US 827 (1950).

[67] There are other forms of contractual packages, such as the "product at hand" form of contract developed by the Algerian authorities which not only include patents trademarks and know-how but also the supply of equipment and erection of industrial plants, the training of personnel as we shall see later in Chapter Five.

[68] H. R. JOELSON (1973) "International technology transfer and the United States anti-trust laws", Journal of International Law of Economics, June, pp102-103.

[69] See UNCTAD "MAJOR ISSUES ARISING from the Transfer of Technology to developing countries" op cit. para 88.

[70] MEXICO LAW of 28.12.1972 op cit. Art. 7(xiii). Even when an agreement provides for a period less than the maximum of 10 years, the agreement may not be accepted, it all depends on whether the technology, subject matter of the contract - can be assimilated in a shorter period than that of the contract.

[71] Argentina Law no. 21617 (1977) Art. 13, and Brazil Normative Act 015/75 Articles 2.4..(a), (b), (c); 4.4, 5.4, 6.4.

[72] In Venezuela the rule is that agreements should not exceed 5 years, nevertheless the competent authority may exceptionally authorize periods up to 15 years. Decree 2442 (6.11.1977) on Common Rules for the treatment of foreign capital and on trademarks, patents, licenses and royalties (Art. 65(e)), in an earlier Decree 63 (28/4/1974). The validity period was 5 years (Art. 56).

[73] India, Guidelines for Industries (1976-1977) Chapter III(8) and (9)(xi).

[74] Argentina Law 20794 Art.7.

[75] For "license of right" see Chapter Two.

[76] See Venezuela Decree 746 (1976) Act. 1(a),(b), Brazil Normative Act 015/75 Art. 4.5.2.

[77] See UNCTAD and Major Issue arising from the transfer of technology to developing countries op cit. paras 45-52, the role of the patent system in the transfer of technology to developing countries op cit. paras. 192-196.

[78] For example Argentina law 21617 (1977) Art. 10(h), Brazil law no., 5772 (1971) Art. 29(2); Normative Act 015/75 Arts 2.5.2.(b)(ii), 3.5.2.(c)(ii), 4.5.2.(d)(ii) and 5.5.2.(d)(ii); India Patent Act (1970) Art. 140(1)(iii) (a), (b), 4(c), Monopolies and Restrictive Trade Practices act (1969) Section 33(1) (a), (b), Guidelines for Industries (1976-77) Chapter III 9 (iv); Mexico law of 28.12.72 Art. 7 (vi), exception to art 7 are found in art 8. Andean Pact Decision 24 (1971), Art. 20 (a) and 25(b).

[79] UNCTAD "Background note by the UNCTAD Secreteriat" TD/CODE TOT/4 (September 1978).

[80] Mr. CHIDZERO (Deputy Secretary General of UNCTAD) "SELECTED DOCUMENTS OF THE CONFERENCE" UNCTAD TD/CODE TOT/SR.1 (15 January 1979) p2.

[81] See Chapter One (the international patent system) - and Chapter Two - (Grounds for the revision of the Paris Convention).

[82] The revision of the Paris Convention is currently being negotiated at the Diplomatic Conference for the Revision of the Paris Convention. The conference has already held three sessions; the first in Geneva 1980, the second in Nairobi (28 September to 24 October 1981), and the last session was in Geneva (October 4 - 30 1982). In the third session the principal question discussed was, whether developing countries should be allowed to grant a temporary exclusive non-voluntary licenses in case of patents not being exploited in the granting country. No decision was achieved because Group B led by the US refused any compromise on this provision. "The Revision of the Paris Convention" Journal of World Trade Law (March - April 1983) pp171-72.

[83] UNCTAD "The role of the patent system in the transfer of technology to developing countries: Conclusion of experts from developing countries" TD/B/C.6/12 (1975).

[84] For further details see UNCTAD "Report of the Group of Governmental Experts on the role of Industrial Property System in the Transfer of Technology" TD/B/C.6/Ac.3/4 (Oct. 26, 1977); UNCTAD "Report of the Group of Governmental Experts on the Role of the Patent system in the Transfer of Technology" TD/B/C.6/8 (Oct. 21, 1975), UNCTAD "Report of the Group of Governmental Experts on the Role of Industrial Property in the Transfer of Technology" TD/B/C.6/24 and Add. 1, (1977), and UNCTAD "The international patent system: the revision of

the Paris Convention for the protection of industrial property"
TD/B/C.6/Ac.3/2 (June 1977).

[85] UNCTAD "Draft of the International Code of Conduct on the
Transfer of Technology" TD/CODE TOT/33 (12 May 1981).

[86] UNCTAD "Report of the Intergovernmental Group of Experts on an
International Code of Conduct on the Transfer of Technology to the
United Nations Conference on an International Code of Conduct on the
Transfer of Technology" TD/CODE TOT/1/Add.1 (July 1978) Annex 1 para 8
of the Preamble, and UNCTAD "Draft International Code of Conduct on
the Transfer of Technology" TD/CODE TOT/14 (28 March 1979) p.2, para
12.

[87] UNCTAD TD/CODE TOT/14 op cit. p4, para. 4.

[88] Ibid, Appendix B, A (1).

[89] Ibid, Appendix B, B (1).

[90] UNCTAD TD/CODE TOT/14 op cit. pp12-17 section B.

[91] Ibid Section A, p.11.

[92] Ibid Section A, p.11.

[93] Ibid, p.28, para 1 (a) and 2 (e).

[94] See UNCTAD "Comparative presentation of the position of regional groups on major issue outstanding" TD/CODE TOT/28 (19 November 1980). To observe the evolution, compare the two summaries of the state of the negotiations: P. Roffe (1980) "UNCTAD: Code of Conduct for the Transfer of Technology - Progress and Issues under Negotiations" *Journal of World Trade Law* Vol. 14, No. 2 (March-April) pp.160-172; and Jean Touscoz "le code international de conduite pour le transfert des techniques" in P. Judet et al (1977). "Transfert de technologie et developpement" Librairie Technique, Paris pp197-225.

[95] See the statement by the spokesman for Group B at the 4th meeting of the Conference (first session) in TD/CODE TOT/10/Add.1 (SR.4. para 19).

[96] See the statement by the spokesman for the Group of 77 at the 11 meeting (second session) in TD/CODE TOT/21 (Part two) (SR.11. para. 1), and the statement by the representative of Algeria at the 5th meeting (first session) in TD/CODE TOT/10/Add.1 (SR.5, paras 20-21).

[97] See the statement by the representative of Cuba "Summary of the 5th Meeting" UNCTAD TD/CODE TOT/SR5 (23 Oct. 1978) p.2, para.4.

[98] Although the Group of 77 acts as a block in confronting the industrialized countries, it will be too difficult to get a unanimous decision on such an issue, because the most highly developed among them are potential exporters of technology, a fact which the industrialized countries know quite well.

[99] UNCTAD "An International Code of Conduct on Transfer of Technology. Report by the UNCTAD secretarial "TD.B/C.6/AC.1/2/Supp.1/Rev. 1 (Dec. 1973), and UNCTAD "United Nations Conference on an International Code of Conduct on the Transfer of Technology: Background Note by the UNCTAD Secretariat" TD/CODE TOT/4 (September 1978).

[100] No agreement has been reached on any part of the chapter on the applicable law and the settlement of disputes.

[101] See UNCTAD TD/CODE TOT/28 op cit. p.16, (Group B, 7.1), and UNCTAD "Draft international code of conduct on the transfer of technology", TD/CODE TOT/25 June 1980 Appendix D.2.III.

[102] For Group B, the courts or tribunals in determining the proper law should, inter alia, take into account the following factors: (i) the principal place of business of the parties, (ii) location of the subject matter of the agreement, (iii) place of performance, (iv) place of contracting; (v) place of negotiations, and (vi) choice of the courts of a certain country. TD/CODE TOT/28, p.16.

[103] Ibid, p.17, (7.4).

[104] Ibid, p.17, (8.3), and Appendix D.2.II.

[105] Ibid, p.16, (A.1), Appendix D.2.1.

[106] Ibid, p.17, (B.1).

[107] Ibid, p.16, (A.3).

[108] Ibid, p.17, (B.2).

[109] For further details on the question of the applicable law see, Francois Dessemontet (1977) "Transfer of Technology under UNCTAD and EEC Codifications. A European view on choice of law in licensing" Journal of International Law and Economics Vol. 12, pp.29-35, Jean-Paul Maire (1974) "Problemes de qualification juridique et de determination du droit applicable aux accords de cooperation economique et industrielle", Annales d'Etudes Internationales Vol. 5, p.95.

[110] UNCTAD "Conflict of Laws in International Multimodel Transport Operation, applicable jurisdiction and arbitration" TD/B/Ac.15/7/Add.6.

[111] PETROLEUM DEVELOPMENT LIMITED. V. SHEIKH OF ABU DHABI (September 1951), International Law Reports "ILR" Vol. 18, pp.144-161.

[112] Ruler of Quater.V.International Marine Oil Company Ltd. (June 1953) ILR, Vol.20, pp.534-547.

[113] Saudia Arabia v. Arabian American Oil Company "ARMACO" (August 23, 1958) ILR, Vol. 27, pp.117-233.

[114] TEXACO OVERSEAS PETROLEUM Company and California Asiatic Oil, Co. V. The Government of the Libyan Arab Republic, INTERNATIONAL LEGAL MATERIALS, VOL. 17, PP.1-37.

[115] See for example, Andean Pact Decision 24, op cit. article 51; Argentina law no. 20794 op cit. art. 5 (K); Mexico law of December 28, 1972, op cit. art. 7(xiv).

[116] For instance the Argentinian law provides that no contract should contain a provision permitting a foreign jurisdiction to settle disputes arising from TOT transactions, art 5(K) op cit.

[117] M. ISSAD (1976) "les techniques juridiques dans les accords de developpement economique" in ONRS "Droit international et developpement" Acts d Colloque international tenu a Alger du 11 au 14 Octobre 1976, pp.1983-196.

[118] See Chapter Five below, note 20.

[119] For further details on the applicable law to international contracts and settlement of disputes see: C. H. ALEXANDROICZ (1974-75) "Empirical and doctrinal positivism in international law", The British YEARBOOK of International Law, Vol. XLVII pp286-289; F. A. MANN (1977) "The consequences of an international wrong in international and national law" BYIL, Vol. XLIII, pp.1-65; Lord MCNAIR Q> C. (1957) "the general principles of law recognized by civilized nations" BYIL, Vol. XXXIII, pl-19; and M. SORNARAJAH (1981) "The myth of international contract law", Journal of World Trade Law (May-June) pp.187-217.

[120] See UN Doc TD/RBP/CONF10/Rev.1 endorsed by General Assembly Resolution UN.DOC.A/RES/35/63 (1980).

**ANNEX 3:1: INSTITUTIONAL MACHINERY FOR THE APPLICATION OF THE TRANSFER OF
TECHNOLOGY SYSTEMS IN LATIN AMERICA**

COUNTRY	EVALUATION	AUTHORIZATION	REGISTRATION	FOLLOW UP
ARGENTINA (1)	National Registry of licensing Agreements & contracts for transfer of technology.	Technical Sub-Secretariat of the Secretariat of State for Industrial Development	Registry of licensing Agreement & Contracts for transfer of technology.	Technical Sub-Secretariat of the Secretariat of State for Industrial Development.
BOLIVIA (2)		NATIONAL INVESTMENT INSTITUTE CONTRACTS DEPARTMENT		
BRAZIL (3)		NATIONAL INSTITUTE FOR INDUSTRIAL PROPERTY		
				Central Bank of Brazil Control & Registration of Foreign Capital.
COLOMBIA (4)	Technical Secretariat of the Royalities Committee, Exchange Office (a)	Royalities Committee Exchange Office (a)	Exchange Office	Technical Secretariat of the Royalities Committee, Exchange Office Exchange Control Board.
ECUADOR (5)	Directorate of foreign Investments Committee on Transfer of Technology.	Under Secretary of the Trade Ministry of Industry and Trade & Integration.	Directorate of Patents and Trademarks Bank.	Directorate of Patents and Trademarks Central Bank.
MEXICO (6)		Directorate General of Foreign Investment and Transfer of Technology		
PERU (7)	Technical Secretariat of the National Committee for Foreign Investments & Technology.	National Committee for Foreign Investments & Technology.	Technical Secretariat of the National Committee for Foreign Investments and Technology.	Technical Secretariat of the National Committee for Foreign Investments and Technology.
VENEZUELA (8)		FOREIGN INVESTMENT CONTROL BOARD "SILK"		

(a) With respect to technical contracts.

SOURCE: UNCTAD "The implementation of transfer of technology regulations: A Preliminary Analysis of the Experience of Latin America, India and The Philippines" TD/B/C.6/55 (1980) p.39.

ANNEX 3:1: (Continued)

- (1) In Argentina, the first law on TOT was enacted in 1971, Law no. 19231. A new set of rules were enacted in 1974 enforcing the earlier legislation and invalidating clauses which prohibits the use of unpatented technology after the expiration of contracts Law no. 20794 (28 Oct. 1974). Further changes were introduced in the law no. 21617 (12 August 1977) which was amended by Law no. 21879 (19 Sept. 1978), as well as Resolution 58 (June 7, 1979). Finally Law no. 22426 of March 1981, abolished the control of TOT between independent parties, and maintained only a limited supervision of the price of technology. Even the control of restrictive practices was left to Law no. 22262 (August 1980) on the Defence of Competition.
- (2) Bolivia incorporated Decision 24 in 1971 (Decree 9798) and entrusted its application to the Central Bank, then in 1978 to the National Investment Institute (Instituto Nacional de Inversiones).
- (3) In Brazil, the legal framework of TOT regulation is based on the Law 5648 (1970) establishing the National Institute of Industrial Property (Instituto Nacional de Propriedade Industrial "INPI") which was entrusted with the evaluation and registration of TOT contracts. The basic principles for the registration of contract are established by the following laws: Industrial Property Code Law no. 5772 (1971); Foreign Investment Code Law no. 4131 (1962) amended in 1964; and Normative Act 015/1975.
- (4) Colombia's Decree 444 set-up the royalties committee (22 March 1967), and Decree 1234 (18 July 1972) established the criteria for approval of contracts. Decision 24 was legally incorporated in 1973.
- (5) Ecuador incorporated Decision 24 by Decree 974 in 1971, and in 1976 established the Directorate of Foreign Investments Committee on TOT.
- (6) Mexico set-up the National Register of Technology Transfer by the Law of 28 December 1972, to govern the registration of contracts. Since 1977 decisions on the matter are taken by the Directorate General of Foreign Investments and Transfer of Technology.
- (7) Peru incorporated Decision 24 in 1971. At present the authorization of the registration of TOT contracts is in the hands of the National Committee for Foreign Investments and Technology.
- (8) Venezuela which acceded to the Andean Pact, incorporated Decision 24 by Decree no. 63 (28 April 1978). The registration of contracts was entrusted to the Foreign Investment Control Board "SIEC" by Decree no. 746 of February 11, 1975.

**ANNEX 3:2: ACTUAL PERSONNEL IN CHARGE OF CONTRACTS EVALUATION
IN LATIN AMERICA (1979)**

COUNTRY	LEGAL EVALUATION	ECONOMIC EVALUATION	TECHNOLOGICAL EVALUATION
brazil	3 LAWYERS	18 ECONOMISTS	8 ENGINEERS
COLOMBIA	2 LAWYERS (a)	2 ECONOMISTS (a)	3 ENGINEERS (a)
	6 LAWYERS (b)	2 ECONOMISTS (b)	1 TECHNICIAN(b)
ECUADOR	1 LAWYER	2 ECONOMISTS	1 ENGINEER
MEXICO	6 LAWYERS	8 ECONOMISTS	6 ENGINEERS
PERU	2 LAWYERS	8 ECONOMISTS	-
VENEZUELA	(c)	4 ECONOMISTS	3 ENGINEERS
		1 ASSISTANT	1 ASSISTANT

SOURCE: UNCTAD TD/B/C.6/55 (1980) op cit. p.7.

(a) Royalites Committee (Comite de Regalias)

(b) Exchange Office (Oficina de Cambios)

(c) Legal Evaluation is in the hands of SIEX.

**ANNEX 3:3: REGISTRATION AND REVIEW OF DIRECT FOREIGN INVESTMENT
AND TECHNOLOGY CONTRACTS IN VENEZUELA (AS OF DEC. 1974)**

	Number of Received Applications	Registered or Completed Contracts	Percentage of Registered or Completed.
1. Registration of Existing Direct Foreign Investment	3635	145	4%
2. Authorization & Registration of new Direct Foreign Invest- ment	84	8	9.5%
3. Registration of Technology 31 December 1983	844	16	2
4. Review & Registration of new Technology Contracts	101	2	2
5. Manifestacio de voluntad	7500	7425	99

SOURCE: SIEX (Superintendencia de Inversiones Extran-Jeras), 1975. Gestion Julio Diciembre 1974, Caracas p.33, as cited by LYNN K. MYTELKA (1977) "Regulating Direct Foreign Investment and Technology Transfer in the Andean Group", Journal of Peace Research No. 2, (1977), p.171.

**ANNEX 3:4: REGISTRATION AND REVIEW OF TECHNOLOGY CONTRACTS IN COLOMBIA
1973-1975**

FORM OF EVALUATION AND APPROVAL	1973	1974	1975(a)
1. Legal Review	-	103	24
2. Economic Review	-	356	86
3. Technical Review	-	356	86
4. Number of Contracts Approved	179	359	33
5. Number of Contracts Rejected	43	44	8
6. Percentage of Contracts Rejected	16.4%	11%	19.5%
7. On Site Visits (follow-up)	-	120	40

SOURCE: LYNN K. MYTELKA (1977) op cit. p.172.
(a) First quarter.

PART TWO

CHAPTER FOUR

THE INDUSTRIAL AND TECHNOLOGICAL POLICY OF

ALGERIA

During the second part of the 1960's decade, Algeria has embarked on a phase of massive industrialization based mainly on public investments. Algeria can be seen as a unique example of an underdeveloped, raw material exporting country, attempting to make short way to the industrial age, and to benefit from the international circulation of technology[1]. The tide of technology importation is principally carried out on the basis of incorporating the imported technology, and where direct foreign investment has no significant role to play[2].

Unlike India and Latin American countries, Algeria had little or no domestic industrial basis. Accordingly patents and licensing agreements did not matter to the Algerian planners as much as the contractual forms. Despite the exclusion of direct foreign investment, the impact of the multinational corporations is heavily felt in the Algerian experience, and makes Algeria for some years to come, more dependent on foreign firms. The causes of such dependency are numerous some were the result

of the long colonization by the French[3], others, were the result of Algeria's technological policy[4]. In addition, the heavy level of investment had equally contributed in widening the gap between the training programmes for skilled and semi-skilled manpower and the required manpower to meet such an investment[5].

The uniqueness of the Algerian experience also stems from the belief of the Algerian planners that, progress does not only mean the importation of machines and equipment[6], but equally the assimilation of these means. In other words, what the Algerian authorities were seeking was not the mere purchase of the means of development but rather to be taught how to produce these means. Machines and codefied technology (i.e. patents, industrial design etc.) are incomplete without mankind, they cannot produce any impact on the environment. Thus, on one hand mankind joins his means (machines, licenses, etc.) in order to produce the desired impact. On the other hand, mankind without knowledge for the application of those technological elements is equally not capable of producing any impact. Such situation leads to a necessary dual relationship for any real transfer of technology to take place: the codefied technology and the knowledgable mankind. In reality, know-how constitutes a natural complement of licenses. Generally, know-how is the practical experience, and as such, it is considered as the most difficult fraction to transfer. The difficulties are derived from the fact that despite the codification of certain know-how, it remains attached to the behaviour of experts and technicians provided through technical assistance.

Although for the transfer of technology to take place in the real sense, the recipient country must have the capacity to make use of the received items according to self-defined goals[7]. The Algerian view, is that the transfer process will be possible only when a developing country joins the industrial process. Since the initiation of the industrialization process, will not only apprise a country of what measures to take in order to increase its technical experience, but also will enable it to receive the transfer of technology[8]. Equally, the Algerian authorities believe that the acquisition of industrial machines and equipment will also have the effect of gaining technologies which are being transformed into formidable means of domination by the industrialized countries.

In order to understand the legal aspects and the way in which Algeria is attempting to gain access to technologies and at the same time to be able to receive the transfer of technology, it is important to have a short background of Algeria's underdevelopment status and the chosen technological policy. The main emphasis of such policy is the training of manpower - learning by doing - rather than the mere acquisition of licenses. The legal aspects will be discussed in Chapter Five. The main concern in this chapter is the analysis of contractual relationship between the national enterprises - public enterprises - and foreign companies, in the majority of cases multinational corporations, in particular the contractual form; plant in production - "produit en main". At the end, the various problems resulting from the experience will be identified by taking the gas industry as a case study. These problems relate to technological information, technique adaptation, training, maintenance, realization and judicial and contractual aspects.

A: THE UNDERDEVELOPMENT STATUS OF ALGERIA

During the French colonization, Algeria was to adapt itself to a specialization of colonial type - (i.e. a source of raw material supply and agricultural products) -. The structure of the economy was marked by strong inequalities and was subjected to the fulfilment of one objective: the supply of cheaper labour, raw material, and agriculture products to both the modern sector of the European minority^[9] and to France itself^[10].

The accession to independence was the crowning of a long struggle which required heavy sacrifices and was a result of a long and painful process^[11]. From the very day it achieved its independence, Algeria was faced with a total disintegration of its administration caused by the sudden departure of the colonial rulers and settlers^[12]. Up to the last years of French domination, the pattern of the Algerian economy was a sort of an appendix to the French one, in a sense the former was on the whole one of complementarity to the latter. This meant the development of Algeria was never promoted, except when the promotion served the French interest. To this extent Algeria had a number of industries with a very low capital/output ratio such as footwear, milling and cement works, but no basic industry on any major scale^[13]. This position was due to the fact that:

- (a) The existence of some industrial activities was necessary, such as the extractive industries in the mining sector, i.e. iron-ore, phosphate, and oriented towards export.

(b) No processing industries for local natural resources existed in this period, since those industries were located in France.

The initial steps towards industrial development were taken in 1958. The extent of the liberation war (1954-1962) caused the General De Gaulle's Government to set-up a development plan called "PLAN DE CONSTANTINE". The declared aim was "In the course of some years, the standard of living of Muslims in Algeria should be raised to the level of people in France itself"[14]. Such unrealistic and ambitious plan was implicitly designed to serve as a political function to win the war by economic means, and to manipulate world opinion and sympathies which the Algerians led by the F.L.N. were winning all around the world. It would be untrue to say that Algerians did not realize the political intentions behind such a plan by France. After all one has only to think of the fact that it took France 129 years to understand the need for an overall economic plan for Algeria[15].

For the "Constantine plan" to succeed, the collaboration of two elements was needed. First the collaboration of local entrepreneurs - (European settlers) -; and, second, the collaboration of French financial capital. It is these two elements which led to the Plan's failure. The increase of living standards for Algerians was considered to be a threat to the European settler's privileges and thus their collaboration was refused. The intensification of the war, led the French investors to think twice before risking their capital[16]. The intensification of the war was a deliberate action designed by the leaders of the F.L.N. and

A.L.N. to combat the French political aim of the Plan. The French investors began to lose interest due to the increased realization that Algeria would probably become independent.

The immediate effects in economic terms of the 1962 political independence were; (a) the outflow of capital from Algeria, where the credit base of banking system was restricted; and a desperate financial situation was created as a result of massive transfer of funds from its treasury and; (b) the loss of skilled manpower resulting in the total collapse of its industry and agriculture which were in the hands of the European settlers.

During the transition period 1962-1966, there was no explicit policy of development as such. The policy of the Government in that period with regards to private investment was that private investment was allowed to invest where the state did not. Such private capital was confined mainly to agriculture and light industry. However, the concern of the state at that time was directed to foreign capital, since it was felt to constitute a limiting factor in the pursuit of an independent national development. After all, the political dependence can only be significant if it is complemented with a corresponding economic liberation. In this context, The Tripoli Program[17] advocated state control of the economy as well as economic planning. Equally, it called for setting up of heavy industries and the nationalization of the banks, insurance, transportation in all its forms, foreign trade and mineral resources[18].

Two years later, the Charter of Algiers[19] also called for the eventual nationalization of the mineral wealth of the country. The absorption of the existing private banks by the public sector was called for. The need to nationalize foreign trade on a step-by-step was also indicated, as well as the diversification of Algeria's foreign trading partners. The Charter further noted the menacing presence of foreign capital and the need to neutralize this potential influence on Algeria's economic and political life. Above all, the Charter called for the setting up of heavy industries in the country and to avoid foreign capital participation, except when it was beyond the country's financial means[20]. The process of nationalization has been essentially completed. As to the industrialization process, this has been accelerated during the 1970 decade. An ambitious development policy was embodied in three plans 1967-1977. The nationalized assets were put under the management of the state owned companies which became the main economic agents of capital accumulation and economic transformation [21].

B: ALGERIA'S INDUSTRIAL AND TECHNOLOGICAL POLICY

The Algerian industrial and technological policy or in short, the Algerian model of development [22] is based on two concepts; The first concept is a strategy deliberately aimed at breaking the vicious circle of dependency. The second concept concerns the establishment of key manufacturing industries, or what became known as the "industrializing industries".

FIRST: The vicious circle of underdevelopment: The vicious circle of underdevelopment is a philosophy which supposes that developing countries should content themselves with a series of superficial transformation such as the assembly, clothing and packing industries. In other words, this philosophy is based on the postulate that the developing countries should postpone their development until the production factors become comparable to those prevailing in the industrialized countries. For a developing country to begin development: (i) The profitability of capital must be comparable to that existing in the industrialized countries, (ii) The size of the market becomes large enough to allow for the creation of basic industries which depend on high production capacities - to wait until the market has developed -; and (iii) A large number of manpower have been equipped with advanced training and technical skills.

Faced with two options, either for the underdevelopment obstacles to disappear, or to embark in development from the start, which would make the obstacles diminish, Algeria has chosen the latter option and argued that the former option is no more than a new form of domination which can not be consistent with the struggle for independence. Only industrial development can constitute an extension of that struggle. To follow the former option would deprive the country from a real possibility of creating and promoting its wealth. Such promotion can only exist in a genuine industrialization. Then the model goes on to argue that the state must control the nation's resources and develop a heavy industry, which refines the country's raw materials [23].

"Two choices are present to Algeria for the conception of its industrialization: to keep to the network and the industrial units that are inspired by the neo-colonialist theories and which are regarded as the only ones corresponding to the vocation of the less developed countries, or refuse to admit that under development is an indelible weakness for the nations who suffer from the imperialist and capitalist alienation, and to set up an industrial policy geared towards an intensive and global industrialization. Algeria stands without hesitation in favour of the latter alternative"[24].

After 132 years of colonization, Algeria found itself with: (i) non existence of market, (ii) no capital and if it existed there was poor return on it, and (iii) no trained and skilled manpower. Firstly the small size of the Algerian market was not considered as an obstacle to development, since industrial complexes were not built on the basis of the existing market size, but instead on the future need of the country which would be generated by development as well as export [25].

Secondly, the low return on capital was considered as the consequence of underdevelopment and not the cause of it. As such, Algeria did not consider the low return on capital to be incompatible with investment, it had to exist in a country with no production units and compelled to import all the necessary goods and services. The return on capital will start to improve only when the Algerian workers become more and more efficient and when the growth of the market makes it possible to erect plants of commercial size [26].

Thirdly, a large number of trained and skilled manpower is necessary for the type of industries which Algeria intended to set up. Such manpower did not exist in Algeria neither in quality nor in quantity. To deal with such a handicap Algeria chose industrialization. In other words, the industrial process was regarded as a way of adding to the technological experience of the Algerian workers. Each operation is reflected in the acquisition of technological capital [27]. Such theory is explained as follows:

"Building industrial units, coping with the innumerable problems arising throughout construction and operation provide the quickest, most dependable and disciplined way of acquiring the know-how and the inventiveness which are the true components of technological capital. Bringing workers face to face with problems bound-up with the acquisition of technology will make them aware of the mastery they stand to win in all spheres, and in the first place over themselves" [28].

Algeria is also aware of the fact that to invest in a project before the accumulation of the necessary technological capital would be at high cost. The cost include the training of personnel, the organization of production and the setting up of industrial infrastructure. Equally, inefficient management and engineering delays in completion, low performance of man and machines, frequent breakdown and repairs all add to higher cost. However, Algeria is determined that the only way to eliminate these drawbacks is the industrialization process itself.

SECOND: The Industrializing Industries

The concept of industrializing industries which is much favoured by the Algerian planners was first founded by the French economist DE BERNIS:-

"The industrializing industries are those whose fundamental economic function is to introduce into their current local environment a systematic development of the industrial matrix and creation of production function which increase the productivity of work owing to the placing of a new collection of machines at the disposition of the economy" [29].

According to this concept the setting up of industries does not necessarily mean industrialization. It is only when the former takes the form of industrializing industries that the latter can take place. It follows that the establishment of heavy industry represents in the long term a certain guarantee against economic dependence on the industrialized countries [30]. The production of consumer goods necessitate the availability of machines which can be obtained either: by the importation of those machines, in which case technological dependence cannot be broken. Or, alternatively, domestic production of these machines can be set-up locally, in which case there is a need to establish a capital good sector - the priority of priorities sector.

The concept of industrializing industries proposed two main priorities: (i) the priority of the industrial sector over the agricultural one [31]; and (ii) the priority of the capital goods sector

over the consumers sector. Accordingly, the concept is an outright rejection of development through substitution, where a consumer goods sector is to be established first which ultimately implies the setting up of a capital goods sector. The function of the latter is to respond to the demand of the former.

Certain policy measures characterize the setting-up of capital goods sectors. These mainly include: (i) the need which such sector has for modern technologies implies a heavy dependency on foreign technology - (i.e. equipment; machines, patents, know-how, technical assistance etc.,) since these are non-existent locally, (ii) to finance such imports, an export sector is required to earn foreign exchange. At the present such sector is represented by the hydrocarbons [32] (oil and gas) and (iii) A voluntary policy which presupposes a political and institutional will necessitate state intervention on a large scale in order to allocate resources adequately. Thus, luxury goods and import substituting industries become incompatible with the policy.,

The whole idea behind the Algerian policy is to obtain machines that can produce machines, and only certain industries are capable of bringing about a progressive industrial integration [33].

These industries are:

1. Hydrocarbons, which apart from being the main foreign exchange earner are the source of energy and the source of input to petrochemicals.
2. Metallurgy, steel, mechanical industries which supply technical capital to other industries (i.e. semi-finished products for the

construction and public works, transportation etc.). In the words of the policy's chief initiator, the late President Boumodiene, there is no economic independence without the establishment of heavy industries.

"There is no economic independence without national heavy industries [....]. Selling cast iron would earn more than selling iron, and selling steel would earn more than selling cast iron. This is an elementary truth which we have taken account of" [34].

3. Chemical industry which provides the necessary inputs for the agriculture sector (fertilizers).

As far as Algeria is concerned, the industrializing industries concept is intended to integrate the national economy - the creation of intersectorial and inter-industries linkage - [35]. Such integration is also influenced by the introversion theory advanced by Semir Amin [36].

The introversion theory supposes two models for capital accumulation: the first concerns the periphery's capital accumulation or the dependent model; the second concerns the capital accumulation of the centre or the independent model. Under the periphery model, the process of capital accumulation takes place under the pressure of forces that are alien to the periphery. These alien forces are transmitted from within the centre. The existence of two sectors export and import of luxury goods characterizes this model. Under the independent - sometimes called autocentric-model, the determinant factor is the relationship between the capital goods sector and the mass consumption sector. Organically, the two sectors are linked at the level of production and exchange [37].

The Algerian choice of an autocentric economy model has no place for a mass consumption sector. It is based on a single sector-capital goods sector - [38]. Such choice appears to be a carrier of an industry with double objective namely integration and coherence.

The consequences of the policy:

At this early stage, one can only point out to certain critical elements of the policy. Firstly, the industrialization policy contains two contradictory elements: increased economic independence and outward industrialization. As far as industrialization is concerned the policy seems to have achieved a number of successes [39], but the same thing cannot be said for increased independence. The setting up of ultra modern industries and the option of the very advanced techniques carry certain risks. Such modern industries require foreign sales markets to absorb products which exceeds the local market need. Equally the need which those industrial units have for modern technology cannot be seen as anything else other than increased dependence which is not temporary or transitional as G. DE BERNIS led us to believe [40]. Bernis believes that the option-industrializing industries means an increasing technological dependence and that such dependency is only temporary and transitional. It might be a miscalculation and even more, misleading to pretend that the imported techniques and management norms can be neutral. The transfer of techniques and norms, conceived in a particular context to respond to a particular requirement tend to reproduce the principal character of their origin. Accordingly, it is possible to erect an exact imitation of industrial plants and machines functioning effectively for example in France or in the U.K. However, it would be an illusion to

think that one could find the same plant in Algeria simply because these plants are identically designed. Production units function differently under different socio-economic structure. Since the domestic technical capacity to adapt, assimilate and develop the imported techniques remain lacking, it is questionable to think of the ability of this approach to lead to economic independence.

A second obvious and serious criticism of the policy is the desire to install heavy industries, highly capitalistic, and the desire to create jobs. Boumediene was aware of the consequence which modern technology would have on the creation of jobs. He refused to accept the importation of less modern technologies even if more jobs would be created:

"We cannot accept machineries dating back to 1940, even if their handling would allow for the creation of more jobs [....]. Sometime I was criticised for having ratified and even encouraged investments that are reputed for being costly and less creator of jobs. I assume the responsibility and I assume the social pressure that would sometimes result from it" [40]

Thus the industrializing industries concept appears to be conceived in the Algerian experience by its proponent as "industrialization at any price". The gigantic investments are poor creators of jobs. For example, the cost of the liquefied natural gas complex at ARZEW LNG1 was \$2400 million and has created no more than 1000 jobs - excluding the construction stage [42]. The weakness of the policy is the fact that it

reduces the question of industrialization to a political one. It implies that sacrifices from the masses inevitably leads to a marginalization of the majority of the people.

The attempt to make a short way to the industrial age appears to have been subjected to a considerable degree of gambling. The international market of technology is a prosperous one, technology has become an essential element of maintaining domination. It is through this approach which could perpetuate dependency in certain countries such as Algeria who have the desire to industrialize. This possibly explains the willingness of the foreign companies to accept Algeria's demand for public ownership and control. These and other consequences will be fully discussed, particularly with the contractual form plant in production in the next chapter.

NOTES

[1] During the 1970's decade, the Algerian leaders boasted to turn Algeria into the Japan of Africa before the year 2000. This was supported by the existence of Algeria's energy resources. Although limited with comparison to those of some of the oil-producing countries, these were regarded as enabling Algeria to implement her development objectives described as highly ambitious in some quarters. See Francis Giles "Algeria has a new sense of Sobriety" Financial Times Feb. 5, 1982.

[2] It is true that direct foreign investment as traditionally defined has no major role to play in the economy of Algeria. However, this may be a misleading impression of the true involvement of foreign investment. By way of example, United States investment in Algeria is less than 100 million dollars. Such a modest sum does not represent the US economic and commercial activities, which include more than 70 firms with contracts totalling several US billion dollars. In addition, financial institutions, including Eximbank have lent Algeria more than \$3 billion - (As in May 1982) - See U.S. Department of Commerce, OVERSEAS BUSINESS REPORTS "MARKETING IN ALGERIA" INTERNATIONAL TRADE ADMINISTRATION WASHINGTON D.C. 20230 MAY 1982.

[3] It is hardly necessary to say that France as a colonial power - from 1830-1962 had neglected the industrialization of Algeria, since the development of industry in Algeria would compete with that of France.

[4] The technological option chosen by Algeria was to go for the very advanced technologies. Such option meant that the country had to rely

more and more on foreign technical assistance in all its forms, to fill the gap and the shortage of skilled manpower or rather the lack of it.

[5] The actual investment in all industrial branches (1967-1979) is shown below: (in million of Algerian Dinars "DA")

3 YEAR PLAN 1967-1969	1st 4 YEAR PLAN 1970-1973	2nd 4 YEAR PLAN 1974-1977	INTERPLAN 1978-1979
(a)	(a)	(a)	(a)
4911.8 (53.6%)	20803.0 (57.4%)	74155.3 (60.7%)	67794.7 (61.8%)
(b) (48.7%)	(b) (44.7%)	(b) (43.6%)	(...)
DA = \$4.935	DA = \$4.185	DA = \$4.035	DA = \$3.755

(a) It should be noted that the figures in parenthesis show the actual investment percentage of all industrial branches, which is in fact higher than the planned percentage share.

(b) The planned percentage share of all industrial branches.

Source: MINISTERE DU PLAN ET DE L'AMENAGEMENT DU TERRITOIRE - IMF INTERNATIONAL FINANCIAL STATISTICS, for the official EXCHANGE RATE OF THE DINAR, for the years 1969, 1973, 1977 and 1979.

[6] Available figures show a massive expenditure on equipment and machinery for industry, excluding capital goods for agriculture: (in million "DA")

1970 : 2238 mDA	1976 : 9681 mDA
1971 : 2248 mDA	1977 : 9858 mDA
1972 : 2367 mDA	1978 : 14060 mDA
1973 : 3012 mDA	1979 : 11777 mDA
1974 : 5311 mDA	
1975 : 8972 mDA	

Source: MINISTERE DES FINANCE : DIRECTION DU DOUANES.

[7] HELGE HVEEM (1978) "TECHNOLOGY AND THE CONTRADICTION BETWEEN INTERNATIONALIZATION OF CAPITAL AND NATIONAL DEVELOPMENT: SOME NOTES ON THE CASE OF ALGERIA "INTERNATIONAL PEACE RESEARCH INSTITUTE OSLO (1st version pre PUBLICATION Nos. 21/78) presented to the International Workshop on "TECHNOLOGICAL DEPENDENCE" BONN/BAD GODESBERG 2-5 Nov. 1978 pl.

[8] DEMOCRATIC AND POPULAR REPUBLIC OF ALGERIA (1974) "PETROLUEM RAW MATERIALS AND DEVELOPMENT" MEMORANDUM Submitted by Algeria on the Occasion of the Special Session of the United Nations General Assembly. APRIL 1974 p.57.

[9] The European minority in Algeria refers to the European settlers who were encouraged to settle in Algeria and were given between 40 and 60 hectares each as an incentive since 1864. For more details see R. GALLISSOT (1969) "L'ECONOMIE DE L'AFRIQUE DU NORD" P.U.F. p.28.

[10] NOREDINE CHOUAKRIA (1978) "THE ALGERIAN MODEL OF DEVELOPMENT"
Unpublished MSc. Thesis QUEEN'S UNIVERSITY OF BELFAST, FEB. 1978.

[11] The cost of accession to independence in terms of human life was expensive. It is estimated that about 1.5 million of Algerians were killed between the 1954-1962 war; 300,000 or more joined the National Front of Liberation "FLN" - about 10 per cent of Algeria's active population, and more 300,000 became refugees in Tunisia and Morocco. When the colonial power realized that the Algerian peasants (between 2 and 3 millions) constituted the backbone of the National Liberation Army "A.L.N.", all peasants were forced from their villages to the "centres de regroupements", a sort of concentration camps. See CHOUKRIA NOREDINE (1978) op cit. and M. BENNOUN (1973) "FRENCH COUNTER REVOLUTIONARY DOCTRINE AND THE ALGERIAN PEASANTRY" MONTHLY REVIEW VOL.25, DEC. 1973, p.47.

[12] Thousands of colonials left for France prior to independence day, totalling 135,000 in 1961, in 1962 the figure increases to 651,000. By January 1963, out of 1 million French population only 200,000 remained in Algeria. Of these 59,000 left in 1963, and 50,000 in 1964.

[13] For more details on the position of the Algerian industry prior to July 1962 see: SEMIR AHIN (1970) "The Maghleb in the modern word: Algeria, Tunisia, Morocco" PENGUIN AFRICAN LIBRARY, pp.121-128. BRUNO ROSSIGNOLI (1973) "The Banking System of Algeria" MILAN pp.16-18.

[14] P. ROBSON, D. A. LURY (1969) "The Economy of Africa" p.489.

[15] In the words of Semir Amin

"The technocrats of the Algerian Plan made the optimistic assumption that the rebellion would be extinguished (did they really believe all the talk about the "last gap" bandied about at the time?)... This illusion was doubtless no greater than that which foresaw the rapid development of a Muslim bourgeoisie".

SEMIR AHIN (1970) op cit. pl24

[16] The Constantine Plan was initiated to run from 1959-1963 but its goals were stated in terms of 25 years. Among the goals it stated for the first 5 years were:-

- to invest \$600 million in industry and to double industrial production
- to create 400,000 new jobs in industry.
- 4 heavy industrial complexes were envisaged, a large steel plant (Annaba), petroleum refinery (Algiers), LNG plant of Arzew and the exploitation of a new phosphate deposit.

In all sectors, the Constantine Plan called for an investment of \$4 billion, half of which was to come from the private sector. The results of the plan were quickly felt, in the sense that, by 1960, about 500 companies had applied to invest in Algeria, 417 of which were given approval. Nearly all of these companies were process industries (chemical, food, construction). However, the actual investment was, \$6 million in 1958, \$80 million in 1959; and \$115 million in 1960. The slow inflow of capital was the result of the liberation war. For further details on the Constantine Plan, see Semir Amin (1970) op cit. ppl23-126.

SEMIR AMIN (1966) "L'economie du Maghreb" Vol. 1 pp.203-213. CHOUAKRIA NOREDINE (1978), op. cit.

[17] In late May and early June 1962, the members of the Conseil National de La Revolution Algerienne (CNRA), a group of political leaders formed in 1956 met in Tripoli, to outline a philosophy and a set of goals to serve as a platform which became known as the "TRIPOLI PROGRAM" and has served as an ideological basis since independence.

[18] The TRIPOLI PROGRAM or CHARTER as it is sometimes called, was of course written just prior to independence, thus, it was suspected of being emotional rather than having a rational approach.

[19] CHARTER OF ALGIERS, adopted at the First FLN CONGRESS 16-21 APRIL 1964.

[20] Ibid, Part two of the CHARTER, in particular section 6 - industrialization. It should be noted that unlike the Tripoli Charter, the CHARTER of Algiers has nothing to say about the domestic private industrial sector.

[21] For further studies of the Algerian transitional period consult the following: M. RAFFINOT, B. JACQUEMOT (1977) "Le Capitalism d'Etat Algerien" MASPRO, PARIS; SEMIR AMIN (1970) op cit. pp 129-133; S. Amin (1966) op. cit. Vol. 1 pp.258-279 for the period 1962-3; S. Amir (1966) "La colnisation et la decolnisation" Vol. 2, pp.9-41 for the period 1963-7.

[22] For further studies of the algerian model of development see: J. C. MARTNES (1973) "Le Model Algerien de developpement" ALGER; CHOUAKRIA NOREDINE Op Cit; A. AKKACHE (1971) "Capitaux etrangers et liberation economique: L'Experience Algerienne" PARIS; K. Amour et al (1974) "La voie Algerienne" Paris and; H. Larbi (1973) Opinions sur l'economie Algerienne" Alger.

[23] As a member of OPEC, Algeria's industrialization approach is not necessarily available to the majority of the developing countries. Since such a resource gives it an additional bargaining power not available to others, the earning from oil and gas increases its chances of acquiring technologies and makes it possible to link the supply of such resources to the acquisition of technology.

[24] LA CHARTE NATIONALE ORDONANCE NO.76-57 du 5 Juillet 1976, CHAPTER 7 PART TWO - Industrialization p.166.

[25] It should be noted that the CHARTER of Algiers had indicated that future industries - heavy industries - should be installed not on the basis of the Algerian market, but rather on a regional geographical market.

[26] Today the Algerian demand for steel, fertilizers, cement and petrochemicals have expanded five folds in less than 10 years, making the installed capacities already insufficient. The same capacities were described as being out of proportion by experts from the industrialized

countries. So, it is not the actual demand what Algeria looks for when deciding on projects, but the demand generated by development acts which in itself would generate the necessary market for the creation of new industries.

[27] Technological capital may be defined as the total sum of non-material resource available to man to enable him to design and understand the machinery which is required increasingly to meet social needs more adequately.

[28] Government of Algeria (1975) Memorandum submitted by Algeria to the Conference of Sovereigns and Head of States of OPEC Member Countries: ANNEX IX ALGIERS, MARCH 1975.

[29] G.D. DE BERNIS (1971) "Les Industries industrialisantes et les options Algeriennes" TIERS MONDE NO. 47 p.547.

[30] The long term objective of Algeria's industrial and technological policy is the attainment of economic independence which implies that Algeria must rely primarily on its own resources for its development. According to P. Balta and C. Rulleau, the option of heavy industries is based on three ideas.

"... souci d'assurer l'indépendance du pays pour ne dépendre indéfiniment de l'étranger dans les approvisionnements essentiels à l'économie, alors qu'existait la possibilité de transformer sur place des matières premières abondantes; volonté

de disposer d'une industrie industrialisante aux retombées
 bénéfiques même si elle n'était pas immédiate; refus de
 l'industrie légère ou de montage importée de l'étranger,
 sensible à la conjoncture internationale, jugée "passive" et ne
 permettant pas un réel transfert de technologie".

Paul Balta et Claudine Rulleau (1978) "La stratégie de
 Boumediène".

La Bibliothèque Arabe Sindbad Paris p.152

[31] The priority of the industrial sector over the agricultural sector
 can be seen from the actual and planned investment since 1967 up to 1979
 in both sectors: (in percentage).

SECTOR	: 1967-69 Plan	1970-73 Plan	1974-77 Plan	Interplan 1978-79
INDUSTRY	: 48.7 (53.6)	44.7 (57.4)	43.6 (60.7)	- (61.7)
AGRICULTURE	: 16.9 (20.6)	14.9 (12.0)	13.2 (7.3)	- (7.9)

The figures in parenthesis show the actual investment while the other
 figures show the planned investment, there is no planned investment for
 the interplan period 1978-79. The priority of the industrial sector is
 further indicated by the fact that only in the first plan 1967-1969 the
 actual investment exceeded the planned investment in the agricultural
 sector. The same can not be said for the industrial sector, where the
 actual investment exceeded the planned one in all the three plans (This
 does not qualify for the interplan period where no planned investment
 percentage is known). Also, Algeria does not believe that agricultural
 output could substantially increase without acquiring the technology
 merely by purchasing fertilizers and tractors and select more or less a
 miraculous seed. On the contrary irreparable damage may be done to the
 soil by machinery and the lack of knowledge of the soil chemistry.

[32] Even the increased prices of crude oil from \$2.35 in 1969 to \$30 in late 1979, Hydrocarbons remain the main foreign exchange earner and represent 92.6% of Algeria's export of which 6.2% represents the share of LNG and natural gas. Despite such income Algeria's external debts stand at \$18 billion. This is due to high level of borrowing during the 1970's decade to finance industrial complexes, see the Guardian, Thursday December 30, 1982, p.15.

[33] The NATIONAL CHARTER, focuses on a number of key issues: development of a diversified and highly integrated industrial base. CHARTE NATIONAL (1976) op cit. pp.166-168.

[34] Cited by A. DOUCY and F. MONHEIM (1971) "Les Revolutions Algeriennes" Fayard p.76; Boumediene was also quoted as saying "without steel there is no development" EL DJEICH-ALGER July 1972 p.29.

[35] For further studies on the integration theory see G. D. DE BERNIS (1966) "industries industrialisantes et le contenu d'une politique d'integration regionale" Economie Appliquee I.S.E.A. no. 3-4 pp.415-473; G.D. DE BERNIS (1968) "Industries Industrialisantes et integration economique regionale" Economie Appliquee I.S.E.A. pp.41-68; G.D. DE BERNIS (1971) OP CIT. PP.545-563.

[36] Semir Amin (1970) "L'Accumulation a l'echelle mondiale" Anthropos p.47 - Semir Amin (1973) "Le Developpement inegal" Editions de minuit.

The introversion theory is well explained in Semir Amin's article: "Le model theorique d'accumulation et developpement dans le monde

contemporain: la problématique de transition" TIERS MONDE no.52, VOL.13 (1972) pp.703-726.

[37] S. Amir (1972) Ibid pp.703-705, and M. Raffinot, P. Jacquernot (1977) "Le capitalisme d'Etat Algerian" pp.147-150.

[38] Although the single sector qualification concerns mainly the period 1967-1978 [the Three Plans Period], it remains valid under the 5 years Plan introduced by the New Government of Chadli Bendjedid (1980-1984) with more emphasis placed on satisfying the social needs.

[39] A degree of integration has been attained at the level of national consumption - that is local consumption covered by local production. The symbols of the policy are natural gas complexes at ARZEW and Skikda which are among the world's most modern and the steel complex of Annaba one of Africa's largest. A number of foreign firms were asked by the Algerian Government to anticipate the required national consumption of certain products for the period 1967-1977. Such consumption supply was often reached and in some cases overpassed by 1974. The estimated consumption of steel was 400,000 tonnes for 1980, 1,000,000 tonnes of steel were consumed in 1973.

[40] G. D. DE BERNIS (1971) op cit. pp.552-554.

[41] Doucy et Monheim (1971) op cit. pp.76-77.

[42] For further details on the influence of the Algerian policy and the option of advanced techniques on the creation of jobs in Algeria see, M. Faffinot, Pierre Jacquemot (1977) pp.212-215.

CHAPTER FIVE

THE LEGAL ASPECTS OF TECHNOLOGY ACQUISITION:

THE ALGERIAN EXPERIENCE

As indicated in the previous chapter, Algeria's industrial policy is not determined by the availability of financial resources but rather by a strategy based on the internal utilization of natural resources[1] and it is deliberately aimed at breaking the vicious circle of underdevelopment. To realize such extremely ambitious strategy, Algeria had to turn to the international technology market and in particular to multinational corporations (MNCs). Intervention by foreign firms is heavily felt due to the lack of local technological capital[2] and little if any of industrial basis. Such intervention is evident in all the industrialization phases - from the evolution of projects to the production stage -. To have a better idea of Algeria's technological dependence and rely on foreign firms we shall first look into the evolution of projects and the contractual procedures. Then we look in detail into the various contractual forms used to implement the policy.

A - PROJECTS EVOLUTION AND CONTRACTUAL PROCEDURES

The evolution of industrial projects is the foundation of all contracts. As it stands now in Algeria this suffers from a number of weaknesses which affect to certain extent the realization of projects at one stage or another. This evolution of projects belongs to public

enterprises and the ministry concerned[3]. Such evolution of projects and the due cost to be allocated to the foreign partners of the National Enterprises (NEs) is usually characterized by an insufficient mastery of parameters which determine the real cost of those projects. Four aspects of project evolution and contracts are of particular importance here. First: the individualization of projects: The main objective behind the individualization of projects is to allow the central services of the Planning Ministry to verify the accounting of the project's investment with that of national development plan (i.e. the control of norms and location). This process has become non-operative due to: (i) the vagueness of project's characteristics, in particular the techniques to be employed and the size of project, (ii) the slowness of the individualization process coupled with the bad evaluation of projects at the national enterprise level and, (iii) the non-respect of planning disciplines (i.e. the delay in depositing the necessary documents for projects) [4].

To this end the individualization of projects tend to be considered by the national enterprises as a mere administrative authorisation. The accumulated delay in this process results in affecting to great extent the decision to invest. In other words, the time span between the completion of the individualization process and the decision to invest, render the financial plan often inadequate. In practice this means that the actual cost of project is often higher than the planned cost.

Second: The choice of techniques: In principle the choice of techniques to be employed in a particular project is assured by the concerned NEs on the basis of technical and economical feasibility studies which the NEs are required to undertake. In practice, the intervention of NE at this type of decisions is very weak if not null. This intervention is often limited to the designation of a head of project "Chef de projet" who with the assistance of an engineering bureaux supervises the realization of the studies. From this moment, the national enterprises level of technological capital becomes a key factor. The Foreign firms not only supervise but in some cases run all operation culminating in the preliminary project. The selection of imported techniques are necessarily based on information provided by the suppliers of techniques, thus it is difficult to control the objectivity of such information. On the other hand the inefficiency of technical information limits the possibilities of selections. Thus, choices tend either to reproduce the already established methods, or to go without discernment towards technological process presented as the more advanced. The risk of choosing the latter option may lead the technology suppliers to using NEs as guinea pigs for the experimentation of new technologies. The choice of the former method is limited in many industries by Algeria's industrial policy - the very advanced technologies option.

The choice of techniques and the technical negotiation of contracts are almost excessively assured by foreign companies. In practice this means that the techniques chosen are not always advantageous to the national economy of Algeria, and more often than not are confined to only to commercial transactions. This conclusion

is apparent from the fact that foreign firms (i) do not furnish neither the basic studies which led to the choice of techniques nor the calculation method or that of the conception; (ii) do not accept any important risk. As a result the foreseen penalties often integrated in the contract's cost do not cover more than a small part of the eventual damage; and (iii) the refusal to integrate Algerian engineers in their studies - bureaux "bureaux des etudes"; laboratories, or other research centres[5].

At the organizational level, the mastery of technology implies a high level degree of coordination and intersectoral harmonization, which can only be assured by an effective co-operation of national economic agents - public enterprises - in a unitarian coherent framework. The lack of a coherent framework is due to the lack of an institutional framework. There is no legislation concerning the transfer of technology, no mechanism for framing relation between the NE's and the foreign partners. There is no obligation to register contracts or even to allow for their prior evaluation or after they come into force. In short there is no control of imported techniques.

Third: the project dimension: The decision on the size of projects are not often backed by economic parameters. In such spirit, the systematic research for the "economies of scale" or "the size effects" is theoretically attached to big enterprises. Such approach often translated on the field by "gignatism" as much spectacular as sterile have caused in the case of Algeria, excessive delays in the realization of the projects, overcost and hazardous mastery of management[6].

The consequences of the retained choice of plant's size were: (i) the grouping of activities of different nature or different complexities had made the management of industries more complicated; (ii) the existence of different technologies in the same industrial branch did not allow the creation of specialized units, which would have made the mastery of the imported technology easier, and (iii) the initiation of important new actions without any sufficient preparation for the condition of their realization, in particular at the economic infra-structure level (i.e. the establishment at the same site of a number of workshops where the technology did not correspond to the product and have created auxiliary activities for the realization of services not assured at the site's environment).

Moreover, the search for integration at the level of micro-economy had led to privileging a constant approach of assuring the very high level of integration at the project's level. The complexity of the erected installations and the difficulty of their mastery - both their realization and management - have rendered the sought objectives illusionary.

Fourth, the location of projects. The choice of the project location was not given all the considerations it deserves. These considerations should have been based on criteria such as the socio-political factors, minimal cost and technical considerations. Thus, the weaknesses of the economic infrastructure and the lack of qualified manpower and management personnel, in the end led NES, in most cases, to concentrate their activities and their units in the north of the country. The overall result of this was that it caused extensive damage to the agricultural land.

To sum-up, it appears that the intervention of national enterprises during the evolution of projects leading to the signing of contracts is very weak. This evolution includes two stages: the first concerns setting optimum targets for production, integration, planning and cost. The second stage concerns the approval of preliminary projects, and to provide clear technical specifications, the services and the goods to be provided by the foreign partners. It is at this second stage where NEs technical capacity becomes a key factor. Due to the lack of such capacity they are neither capable of providing the technical specifications themselves nor able to supervise this process. The result is that they leave such process to an engineering consultant invariably a foreign one.

It is not only the lack of technical capacity which render the NEs dependent on foreign companies, but equally the lack of a clear technological policy of the comparatively short experience, in particular the absence of an institutional organism for the incorporation and integration of the imported technology. The absence of such organism becomes more apparent when contracts are entered into force for the supply of services, goods and the erection of industrial plants - realization stage - it is this late stage which is the main concern of this chapter.

Before the discussion of the realization stage and the different contractual forms which it involves, it is important to mention briefly the question of import and export monopoly. As far as the importation of technology is concerned, almost all major purchasing by the NEs and

Gouvernement offices is done by international tender. There is no Central Government purchasing authority^[7]. Under the public law of 1978, exports and imports of commodities and services are the monopoly of the state^[8]. Such monopoly is carried out by the state or public enterprises each within its field of specialization^[9]. Prior to this law only imports were subject to state monopoly, while exports were governed by an export permits regime^[10]. As far as import by foreign companies is concerned, only those firms who have an agreement with the state or its agencies; or in cases where the foreign firm is a party to a contract with NEs, whereby it is responsible under the terms of the contract to provide equipment, machinery and products for the realization of industrial works.

Even in such cases, the right to import is not automatic but subject to import permits^[11]. These provisions implicitly exclude the patent owner from importing into the country the patented product. The law of 1978 contains two important provisions concerning the conclusion of contracts between NEs and foreign firms. On one hand contracts with foreign firms can only be concluded by the state or its agencies^[12]. On the other hand, the intervention of distributors, representatives, agents and intermediaries of any kind on behalf of foreign firms is prohibited^[13]. The prohibition of intervention by agents is the direct result of the discovery of a wide spread of malpractices, whereby agents illegally benefited from their intervention^[14].

Apart from the foregoing provisions, the following practices and bargaining techniques are used in the negotiation of contracts in Algeria: (1) Bid documents and performance bonds. All bids are

required to be submitted in a sealed envelope^[15]. Bid bonds are usually not required except when the project is very large. Performance bonds, when required, are of two types: (i) unconditional bank guarantee to be held until the fixed level of production is obtained; (ii) a cash guarantee to be repaid during the life of the contract. Firms with previous good record experience in Algeria can have performance bonds waived. The imported machinery and equipment can not be used to affect performance bonds since they are considered as the property of the NEs. Usually the bonds are between 10 and 15 per cent of the contract's value.

(2) Performance requirements and penalties: Many performance requirements are included in contracts particularly in the contractual form "product in hand" or "plant in production" as it is sometimes called. Some of these requirements concern fixed deadlines for the realization of industrial projects, fixed level of production - both production quality and quantity - and other obligations. The majority of these obligations carry penalties and apply effectively to the foreign firms only. Often there are no enforcement clauses with regards to the obligations of the Algerian contracting party, if such obligations were stated in the contract, the obligations of the foreign contracting party cannot be mitigated by the failure of the Algerian party to meet his obligations. For example, the penalty imposed on the foreign party, if such party fails to erect a plant or industrial works in an agreed period of time cannot be mitigated even though the cause of the failure to meet the contracted date may well be the lack of adequate delivery of cement which the Algerian party had agreed to provide.

(3) Price: Two cost's methods are used in contracts passed between NES and foreign firms. The first is the cost-plus-fee method favoured by foreign constructors. The second is fixed price contracts often demanded by the Algerian party. Increase in project costs due to inflation is not covered by clauses, though in practice, inflation has been used as a basis for renegotiation of the contract's price (i.e. SONATRACH and CHIMICO contract for the erection of LN1 at Arzew) [16]. The cost of equipments and machinery are agreed upon by both parties during the negotiation of contracts [17]. On most of the large scale projects, the foreign party is often required to guarantee the supply of spare parts beyond the period of the manufacturer's guarantee and for which a price escalation clause is not possible [18].

(4) Training: This is an essential element in plant in production contracts but not in turnkey contracts where it is the subject of a separate contract. The quality of personnel training associated with a given project amount to the same importance of the potential output of the contracted industrial work [19].

(5) Arbitration and the applicable law: National enterprises often prefer the recourse to the national law and going before local bodies. Accordingly, the Algerian Law is the most frequently retained and rarely there is a recourse to a foreign law and exceptionally custom law and the general principles. However, the almost systematic recourse to national law - which is supposed to provide minimum protection for the NES - is a misleading optimism. Since on one hand, the Algerian law of obligations is not fundamentally different from European Laws, in particular the French Civil Law. On the other hand,

the application of the retained law is not in most cases under the national jurisdiction, but rather belongs to foreigners who, often constitute the arbitration tribunals. Anything which may appear to those tribunals as prerogative is often eliminated for the sake of international commercial customs and the security of transactions. Thus what really matters in this context is not the rules of law but their application or non-application[20].

(6) Force majeure: Force majeure clauses are negotiable. Once a definition is agreed upon by the contracting parties it cannot be altered. Generally speaking, such definition typically includes: wars, natural catastrophies and new legislation foreclosing the possibility of further work. Onerous factors are not considered as force majeure, though sometimes can be used by the foreign constructors in arguing for an extension of the fixed delay set-up in the contract. Labour disputes and congestion of ports are not usually considered part of the force majeure.

Beyond the foregoing mentioned items, it is not possible to say with precision what is and what is not negotiable.

The structure of technology importation in the Algerian experience is analysed through the different contractual methods used for the realization of industrial works.

B: THE CONTRACTUAL ASPECTS OF THE ALGERIAN EXPERIENCE IN THE FIELD OF TECHNOLOGY TRANSFER

One aspect marking the evolution of the policy of technical importation is the particular attention given to the contractual forms binding the national enterprises and their foreign partners. Foreign firms are required not only to execute properly their contractual obligations in matters of the realization of industrial works, but also to agree to an effective transfer of their technologies and know-how. However, in practice, it must be noted that the contractual relationship between national enterprises and foreign firms is different from that binding two companies in the same country or countries in the industrialized countries. The contractual relationship in the industrialized countries is often between two companies of an equivalent technological level. Under such a relationship, it is neither possible nor worthwhile for any partner to benefit excessively from temporary situational advantage. The established relationships are not short lived nor adventitious and it is thus guaranteed that there would be no abuse of dominant position^[21]. When it comes to technology, the relationship between foreign firms and national enterprises is a one way relationship. Technologically the contracting parties and their states are on an unequal footing with one another. There are intermittent relations in which it is customary to exploit the utmost strength of the dominant position. National enterprises, because they lack the mastery of technology, often do not benefit from the entitlement of the contract

provisions. Often they cannot exercise their legitimate and recognized rights while an industrial project is in progress, since they are not capable to carry out the required controls and insist on the foreign partner to take the necessary steps to ratify any errors should the need arise. Throughout the duration of the contract, the role of national enterprises is altogether passive. Because of the lack of technological capital, they resign inadequate to the fact that all initiatives must be taken unwarrantably by the foreign partners who can act as they think fit.

The awareness of the unbalanced contractual relationship between foreign firms and the national enterprises in matters of technology is expressed through the search for new and more satisfactory forms for the acquisition of technology. In this context, the choice of methods for the realization of industrial projects is characterized by the crossing from one method to another. Such crossing concerns the following methods: (1) separate contracts, (2) Turnkey contracts; (3) plant in production and, (4) mixte enterprises.

(1) Separate Contracts

Separate contracts or service contracts isolate the supply of equipment from the supply of services (supply of equipment, design consultancy, control, expert advice, training, technical assistance, plant erection, civil engineering etc..). It is a form of contract whereby an industrial project is divided into different contracts with different contracting parties. Each of the parties is directly

responsible to the concerned national enterprise for the supplies or performance of the work entrusted to him under the terms of the contract. Sometimes there is a combination of two services (i.e to award the contract for technical assistance and plant erection to the same contractor) [22].

Since the national enterprise is the only one contractually bound to all other contracting parties, it is its responsibility to coordinate all the works in order to ensure that the various parties do not hamper each other and that their work is performed in the correct sequence.

An example of this type of contract is represented by one of the vast industrial complexes of iron and steel - EL-HADJAR steel works - near Annaba in the North East of Algeria (Annex 5:3). Foreign firm partners of the Societe Nationale de Siderurgie (SNS) tend to favour separate contracts, because of the limited guarantees which they have to provide.

It is the SNS who may be held responsible for the effects of the delays in the performance of work and supplies of one of the contracting parties. For example, if the firm which is contracted to supply equipments does not observe the time limit, or the equipment which it has supplied were found faulty, this may have an effect on the obligations of the other firms responsible for the erection of those supplied equipments. Such effects may include time limits and consequently penalties for delays.

In cases where there is a defect in the plant and where the responsibility of one or more the contracting parties prove impossible to establish, it is the SNS which bears the financial consequences. The SNS is then responsible for anything beyond the limits of its contracting parties' responsibilities. To avoid these risks, the SNS may insert in each individual contract liability clauses, in particular with respect to delays. These liability clauses often go beyond the normal guarantee clauses included in the supply and services contracts. However, if the delay is due to the inadequate coordination of work by the SNS, it will be obliged to accept responsibility vis-a-vis the other parties who were affected by the lack of coordination.

If the delay has repercussions on the work of other firms who have performed their contractual obligations, the national enterprise will have primary liability for the resulting damages to the affected parties. Then it can take actions against the contracting party or parties responsible for the delay to recover the sums it has been obliged to pay in the compensation to the other parties who performed their contractual obligations.

The establishment of El-Hadjar iron and steel complex represents the core of heavy industry in Algeria. Accordingly the iron and steel branch absorbed the second highest percentage of industrial investment preceded only by the Hydrocarbon sector[23]. However, at the time it was taken[24], the decision to build El-Hadjar had represented a seemingly hazardous choice both in terms of investment[25] and market.

As far as the market is concerned, the increased local demand for steel has shown the extent to which the choice was justified. Three objectives were set-up for El-Hadjar complex: (i) an annual output of 4000,000 tons amounting to an investment programme of 2000 million Algerian dinars[26]; (ii) the second objective was the diversification of final products and the meeting of new demand[27]; and (iii) an annual steel production of two million tons[28]. Not only the whole range of finished products produced in El-Hadjar complex were locally consumed, but Algeria was forced to build another steel complex in the West of the country: "We have decided to construct a new iron and steel complex in the West of the country, which will have an annual capacity of 10 to 12 million tons"[29].

The result achieved during the three plans period is the very substantial development of the SNS which has accumulated experience of decisive importance for the future. Like many state owned enterprises the SNS, has an engineering department staffed, in part, by expatriated engineers. The department (about 200 staff) - is essentially directed towards working drawings produced on a subcontracting basis for foreign engineering companies. Lately, the department was developed to provide all executive engineering services through construction in particular for part of the general utilities of the complex. The department was formed during the planning stage and started to function in 1969. The SNS insisted that its own design engineers should sit-in as counterparts to the foreign consultants in order to get experience of project planning and design techniques and also gain familiarity with the technology of the future enterprise. During my visit to the

complex in the summer of 1981, I was told that the department was engaged at that time in producing a file on all the different equipment and processes. Furthermore, it was stated that such a file would be consulted prior to any new acquisition of processes or equipments.

However, the construction of El-Hadjar and the training of manpower to operate it ran into severe difficulties which delayed the execution of the programs and the build-up of production. Thus, at the end of 1979, 20 medium sized projects in the steel industry had not yet been completed representing a total carry-over cost estimated at 6.3 billion DA[30]. Most of those incompleted projects related to the extension of El-Hadjar.

In my view, I think it was possibly wrong for the SNS or any other national enterprise for that matter to start its introduction to industrialization through this form of separate contracts. Such form of contracts though provide additional competence enabling the SNS to exercise certain degree to defend and control its interest by being the only partner who is contractually bound with all the other parties. Such responsibility requires a certain degree of technological capital to allow the SNS to control and coordinate the different phases of the realization. Neither the SNS which was established only in 1964, nor the infant steel industry had the capability to coordinate the different types of the imported technology to a single complex comprising many units. As shown in Annex 5:3, the construction of El-Hadjar is very diversified in terms of the imported technologies - geographical diversification - . Essentially those imported

technologies come from the capitalist countries[31]. However, such diversification which is politically motivated by the oil dispute between Algeria and France during the 1960's and early 1970's, could only have added more problems to the newly established SNS. More often than not, the diversification of supplies appears only at the national level, since in many cases it is the same technological process which dominate an industrial branch world-wide. Even if the diversification of supplies was designed to ease the pressure which a single contracting party may hold on national enterprises, it would have had a little impact, if any, as foreign companies tend to coordinate through tacit market sharing - (sub-contracting) -.

The weaknesses of the separate contracts method reside in the shortage of technological experience and the mitigation of the responsibilities of the foreign partners with regards to defects and delays. At the time when contracts were signed, the SNS was not in a position to benefit from the entitlement of the contracts provisions. Further, it did not know how to invest or manage industrial projects. It lacked human resources, not only skilled manpower and technicians but also qualified administrative staff. Accordingly it was not able to carry the necessary coordination between the different contracting parties which is vital in this type of contract.

Faced with such a situation, the case of El-Hadjar suggested to the Algerian authorities the need to acquire industrial units under a more packaged form of contracts. It is now, in the 1980's, when the SNS and other national enterprises have gained considerable experience in the field of technology and management of industrial units that they

ought to opt for more separate contracts but not at the time when they were newly created. They are in a position, in particular the SNS - to do part of the engineering, maintenance and above all have acquired the necessary human resources to coordinate and rectify errors. The collaboration of foreign contracting parties was no more than a simple commercial operation, without any real guarantee to the national enterprises.

2. TURN-KEY CONTRACTS

In the context of Algeria, a turnkey contract may be defined as an undertaking by the foreign contracting party at the time of the conception and realization of projects to deliver to the national enterprises industrial units as they exist and function abroad. In other words, the foreign contracting party is assigned the task of providing all the services. Accordingly he is responsible for engineering work; purchase and delivery of equipment; erection of plants; supervising the work, start-up trials and technical assistance[32]. The choice of patents, fabrication procedures and equipments are in principle reserved to the concerned national enterprise, but rarely this is the case.

The idea behind the introduction of this type of contracts to Algeria is to offset the national enterprises own lack of qualifications. Turnkey contracts are designed at least theoretically to pinpoint easily and rapidly the areas of responsibilities and malpractices of the foreign contracting party and any deviation from

the contractual specifications for which he can be held responsible. Such responsibilities are not difficult to pinpoint to, since the foreign partner's responsibility is global as he is the only contracting party with the national enterprise - unlike in separate contracts formula[33]. Unquestionably, turnkey contracts offered greater protection for national enterprises, who instead of having a multitude of partners taking advantage of their incompetence by blaming one another for those malpractices to avoid responsibility, national enterprises deal with a single partner who is responsible for everything.

The resort by national enterprises to turnkey contracts owes much to the comparative failure in El-Hadjar steel complex, as well as to the arrival of American and West German firms to compete for industrial contracts in Algeria. Equally, the introduction of turnkey contracts was boosted by the increase in petroleum revenues, since this form of contract is quite costly.

Although turnkey contracts restored some degree of justice to the contractual relationship between NEs and their foreign partners. However, such theoretical balance did provide NEs with no more than equipment without crew "equipment sans equipage". So what are the possible advantages for NEs opting for this contractual form? First, there appears to be a clarity in the realization of projects, and except for the physical existence of plants, the advantages tend to be minimum. To this extent, the widespread option consist of affirming that the creation of the same industrial plants is the only valuable

compensation. The widespread use of turnkey contracts, reached a very high level during the First Four Year Plan 1970-73, where 67 per cent of all contracts concluded during this period were turnkey contracts - (30% integral turnkey contracts and 37% partial contracts) [34]. In fact all the contracts in the petrochemical industry concluded between 1967-1975 belonged to this category [35].

The construction of these petrochemical plants ran into very serious problems. By way of example one could look at the case of the Skikda complex for ethylene and PVC which faced a one year delay in the execution, the construction of which was entrusted to the TOKYO Engineering Corporation and ITOH, both of Japan [36]. Apart from the delay of one year, there was the problem of the training of personnel and skilled manpower. According to a World bank report, the cost of technical assistance represented 50% of the running cost of the complex in 1980 [37]. The ARZEW's first Ammonia plant also suffered from design errors by the constructors, TECHNIP and ENSA of France.

Secondly, a turnkey contract is a means for establishing industrial basis in developing countries. It is a way of setting-up industries without being obliged to master the techniques of conception, realization, control and coordination. As such, it cannot be seen as industrialization, but rather the buying of industrialization. It also allows NEs to avoid the distribution of tasks for the realization of industrial plants. The fact that NEs will only have to deal with a single partner enables them to put their limited human resources to a better use. In other words, the coherence

of the whole operation, due to the uniqueness of the foreign partner, means that the concerned NE can have its attention concentrated to that single partner. thus it can play a more positive role with regards to solving conflicts concerning delays in the realization and performance. According to Judet and Perrin, the advantages which a developing country can obtain from turnkey contracts are as follows:

- "- The turnkey contract is a means for setting up the basis for industrial production without being forced to master the techniques of conception and realization.
- The turnkey contract guarantees a shorter time limit than if local possibilities were to be used.
- The turnkey contract disavows the recipient enterprise from responsibility and place it entirely upon the foreign contracting party.
- The turnkey contract hence appears less costly than a locally governed contract and integrating national structures of conception and realization which have yet to unfold"[38]

As far as the cost and delays accumulated through the use of turnkey contracts are concerned, things are not what they seem to be. It might be true that turnkey contracts are less costly when compared with other contractual forms and may also tend to shorten the delay period. However, to obtain these advantages, national enterprises must not have a shortage of qualified manpower.

However, these supposed advantages are in most cases disadvantages in themselves to the future industrialization in general and to the

national enterprises in particular. The danger of turnkey contracts procedure is that industrial units and plants are only partially realized, meaning that only the physical existence of those plants is materialized. Against this, there is no guarantee for either functioning or production and since the majority of NES were with no industrial experience, the risk of being victim of certain abuses and malpractices were very high. In the context of Algeria, turnkey contracts are characterized by a number of inconveniences.

Firstly; the role of NES is reduced to a role of spectator. Turnkey procedure possesses a dangerous virtue of masking the incapacibilities of NES to participate in the elaboration of all the phases of realization of industrial plants. In other words, this procedure deprives NES of gaining any useful experience. Generally, the concerned NE does not intervene at any stage with the conception, and realization of its future industrial plant. The same NE is often confined to administrative tasks. In cases where there is a real acquisition of technology, through the training of manpower, such acquisition is minimum as the training is assured by a foreign partner other than that of the plant constructor. To this extent there is no continuity between the realization of the plant and the training of manpower to operate it. Thus, this method can be described as the method determined by the discontinuity of steps. In a sense all the phases of conception and realization are characterized by the application of commendable techniques by the foreign contracting party. As far as the exploitation phase is concerned it could be the subject of an improvisation or at least empiricism. The discontinuity appears flagrant when the foreign partner is absolved from responsibility[39].

It is at this point when the problems of discontinuity will be felt heavily by the NEs. The most concerning one is that of qualified manpower - which is consequently not solved by turnkey contracts. To operate the constructed plant, national enterprises require trained personnel for production and maintenance. Two options are open to the NEs; either the recourse to technical assistance which has its limits and above all is costly^[40], or to train its own personnel, which in my view is the best way^[41]. Thus, the absence of an effective transfer of technology could only have generated a continuous technological dependency on foreign firms to erect plants, operate them and maintain their running. By way of example, the Algerian Government in its economic report for the period 1967-1978 which is by far the most critical report ever produced by the Government - admits that up to the end of this period no record exists of any Algerian team capable of repeating the erection of any of the industrial plants^[42].

Secondly, the absence of real guarantee concerning the good functioning of the plant after its final delivery to NEs. It is true that the foreign contractors furnish mechanical guarantee, but these are limited in time. The insufficiency of guarantees is a very grave one since it risks transforming the realization of industrial projects to a mere cash flow and reduces it to a commercial operation. The fact that the foreign partner is absolved from responsibility is no remedy to national enterprises. The objectives set up by the technology receiver - national enterprises - may not necessarily be met by a successful start up test. On one hand NEs are obliged to sign final acceptance and hence to absolve the constructor from responsibility

even before it is possible to carry out tests. Such automatic acceptance can happen in cases when for reasons directly imputable to NEs and indirectly imputable to the foreign constructor - completion of the work is delayed beyond the date fixed in the contract. As a result of automatic final acceptance, NEs can be deprived of some of their contractual rights^[43].

On the other hand even if tests are carried out, they are not that significant. Contractual clauses allow for tests to be partial and instantaneous and only certain qualified parameters undergo tests. Accordingly tests have been performed on units and sub-units rather than on installations as a whole. The signing of the final acceptance does not guarantee the good functioning of non-quantifiable but fundamental factors (i.e. sturdiness of equipment; technical security of installations; adequate intermediate storage capacity, proper design of auxiliary services in particular and distribution of utilities, ease of operation etc). These non-quantifiable factors can not be verified before the foreign contracting party is absolved from responsibility. Further, it is in these factors where foreign constructor tends to take full advantage of the ineffectiveness of NEs to control and makes every effort to economize at their expense.

Thirdly, remedies of non-compliance: generally, penalties are limited to 5% of the contract's value, which under normal conditions - equally developed partners - can constitute a sufficient incentive for the constructor. The 5% is rarely attained, since any deviation from the contract specification can easily be spotted by the effective

control of the equally developed partner. However, this is not the case in Algeria, firstly constructors and manufacturers are only invited by tender and they often allow for comfortable margins when calculating the contract prices. Therefore, even if the 5% penalty is reached, the price of the contract remains highly remunerative for the foreign partner. Secondly, while construction of industrial plants is in progress, the fulfilment of contracts is already marked by inadequate control on the part of NEs. Thus, when the 5% is reached - which is precisely the case - the foreign contracting partner has no further reason to limit malpractices and workmanship.

Let us for example suppose that a 5% maximum penalty is applied for delays in the completion of a gas pipeline. This delay may amount to years rather than weeks if this 5% ceiling is reached. The prejudice suffered by the concerned NE will be totally different from that suffered by a firm in the industrialized countries. A new installation often occupies a basic and special place in the economy of Algeria, while it is only marginal to what already exists in an industrialized country. A delay of one year in the pipeline - which forms a part of the overall gas field's equipments - corresponds not only to the loss of cash flow, but also to the operating cost. The operating cost concerns all the expenses which NE has to meet without receiving counterpart (i.e. to pay workers who have to be recruited and trained. They will be producing nothing and since no other installation may exist, cannot probably be employed elsewhere). Furthermore, since Algeria's industrial policy calls for the integration of economic activities, the delay in the pipeline prevents the putting into force of liquefaction plants and gas fields. In short, such delay would effect everything downstream and upstream from the pipeline.

The fourth inconvenience consists of the foreign constructor's total power over the construction of the plant. The majority of contracts passed between NEs and foreign firms are based on an inclusive amount - fixed contract price - rather than on cost plus fee method. This inclusive cost gives the constructor the possibility of avoiding all cost details, and since he is the only one to know and negotiate the prices of different elements constituting the future plant, he can unduly exaggerate the components prices (i.e. civil engineering, placing of installations). He can also retain extremely costly norms whose efficiency is doubtless or where the price does not correspond to the production necessity.

In this context, the principal weakness of the turnkey contracts is the exclusion of the client NE from participating in the negotiation of component's prices. Apart from allowing foreign partners to impose excessively high prices, it may also generate technological dependence. The foreign partner can call upon his own firm or country for the supply of technology, rather than those available locally or which could be supplied at a cheaper price from the international market. On the other hand he could create a dependent industrial structure by choosing technological processes or equipments corresponding to the industrial structure of his own country or industrial plants and factories.

Finally, turnkey contracts are too much concerned with the realization phase of projects and gives little if any to the question of quality and quantity of production. Above all, the weak

intervention of NEs in this type of contracts leaves them with the responsibility which was in the first place the cause for granting these type of contracts. Since the NEs are excluded from the control of the realization process of their future industrial units, and since the foreign partners have absolute freedom - (buying material, plant's erection, price negotiations, choice of equipments and organising the works) - they search to make all the imaginable economies from the totality of perceptible elements of the industrial units. Inevitably, malpractices and abuses on the part of the constructor are not discovered until plants are into production and often after the responsibility of foreign partners was terminated. The more grave abuses concern production performance and in particular the duration of the production life of units. A production unit with too many abuses will have a short production life, due to numerous difficulties met during the initial stages of production (i.e. breakdown, incompatibility of the employed processes, problems of repairs and maintenance etc.) as well as the weaknesses of possible remedies designed to reduce the prejudices and abuses suffered by the NEs. To sum-up, it is the following reasons which have favoured and still do in many cases the awarding of turnkey contracts:-

- (i) The shortage of qualified national personnel and experienced technicians;
- (ii) The initial weakness of national capacities in the fabrication of equipment goods; and
- (iii) The administrative complexities (it is easier to administer turnkey contracts than several separate contracts).

Apart from the administrative problem, the method turnkey failed to satisfy the Algerian planners and prompted them to search for a more favourable contractual method. The availability of finance - due to the increase in oil revenue at the end of 1973 and in particular the shortage in skilled manpower precipitated the country and its planners to opt for a more alienating and global method of transfer. In order to solve the problem of discontinuity between the stage of realization and that of production, the new form implies a total abandoning of the conception and the realization of industrial plants. Thus they launched a new contractual form called "Plant in production" contract "PRODUIT EN MAIN" [44].

3. PLANT IN PRODUCTION CONTRACTS

The method of plant in production "produit en main" is a reaction to the difficulties and disappointments of the turnkey contracts. This recently developed method engages the foreign contracting party more deeply with national enterprises. The foreign partner is not systematically absolved from responsibility at a specific date following the putting into service of installations, but under conditions and at times which are non-existent in turnkey contracts [45]. The method plant in production is destined - at least theoretically - to ensure total collaboration of foreign firms, and where the objectives are to improve sensibly all the delays in; the realization of industrial projects; production output; the start-up operations, management, the qualified manpower and the efficiency of technical transfer.

By virtue of contract, the foreign companies contracting under the method plant in production "PIP" is required to provide the following services to the concerned national enterprise:

- the delivery of industrial plants in the form of turnkey "TK"
- the guarantee by the same partner to train Algerian personnel both abroad and in Algeria - in plant training -;
- to furnish technical assistance for the functioning of the plant and to guarantee the initial management of the plant up to the cruising stage;
- to organise the plant's manpower - to post technicians and semi-skilled personnel in the plant's different services;
- to guarantee production both in quantity and quality corresponding to a fixed calendar;
- finally he is under the obligation to communicate to the NES: licenses and documentation of fabrication, his show-how and know-how in order that the contract results in a transfer of technology.

Though the PIP method is a more global and packaged form of technology transfer there are reasons to believe that it is an ideal method for those countries such as Algeria who lack local technological capital. It coincides with the needs of NES since the foreign party is contractually obliged to execute all the contracts elements in a simultaneous manner.

Apart from the forementioned elements, the discharge given to the foreign partner is not carried out only once but rather in many times

according to a contractually agreed timetable. In other words, the cost of installations and the method of payments are fixed at the time of signing the contract, and where payments are not anticipated for arbitrary dates, but according to a calendar essentially based on the appreciated production of a double of parameters - quality and quantity. The remuneration of the contract's price to the foreign contracting party was in many cases indexed to:

- (i) the smooth planning of construction, the commencement of production and its gearing up;
- (ii) the quantities of production reached from one year to the next at a contractually fixed dates;
- (iii) the qualities of production according to the contractually agreed dates;
- (iv) the insertion of the Algerian personnel trained by the foreign partner - in the running of the constructed plant.

The indexation of payments based on the above parameters is not opposed to the preliminary fixation of payment at the time of signing contracts. Such indexation is designed to provide more guarantees for the contracting national enterprise and at the same time to give the foreign partner an incentive to meet the contractual commitments. Otherwise the payment suffers a proportional penalty for the noted difference. Conversely if the production or the difference is on the positive side, the foreign partners receive above the anticipated amount, a supplementary payment as a reward for better and faster production[46].

The foregoing commitments required from foreign companies and the indexation method of payments meant that the number of offers by foreign firms for this new contractual form was limited in many cases. Generally speaking, foreign firms have manifested their opposition to the "plant in production" method, which may suggest that the method is not advantageous or attractive to them^[47].

Despite the inherited common grounds: language, habits of consumption and work, as well as France's financial aid to Algeria in the 1960's decade, French firms found it most hard to compete for contracts of this type:

"Faced with this type of contract, the French industrialists have several objections.

To start with, the duration of the operation by which an enterprise provides services and supplies equipments must be prolonged. An average of 3 to 5 years is required to gear up production in an industrial plant in the mechanical industry. In addition, the functions of the French enterprise are modified. The enterprise does not only proceed in installing equipments, but also train the manpower which will run the plant at a profit rate and qualities identical to those obtained by the French factories"^[48]

Apart from these reasons which concern the French firms themselves such as their capabilities of coming to terms with the responsibilities which PIP implies (i.e. to immobilize their own personnel to run the

plant for a period between 2-3 years after construction). There is also a certain lack of enthusiasm in their relation with the Algerian national enterprises[49].

The introduction of "plant in production" was first sought for the construction of the Engine and Tractor Complex at Constantine[50] though the contract was first signed as a turnkey contract in 1969 with the West German firm DEUTCH INDUSTRIE AN LAGEN GESELLSCHAFT "DIAG"[51]. DIAG has manifested the desire and the capacity to coordinate six different licensors, preceded by the traditional reputation of West Germany, it went on to penetrate the Algerian mechanical and electrical engineering industries[52]. So why was DIAG the first to show its willingness to accept this new method while other firms had reserved their position and anticipated that industrialization through integration is risky? The reasons could be attributed, on one hand to the fact that DIAG is a state controlled company and receives a substantial financial loan from the West German Government. Thus the acceptance of the new contractual conditions and rules may have been politically motivated. On the other hand, DIAG's technical capacity in the field of mechanics is enormous. It managed to round-up and coordinate more than six licensors in the context of executing plant in production contracts. It has in particular obtained the collaboration of other West German firms (i.e. KLDECKNER HUMBOLDT-DEUTZ and KLAAS), in the realization of important industrial projects[53].

The method plant in production rests on four major elements - apart from those already included in turnkey methods:

1. the initial management of the plant or the dualistic structure of management,
2. the training of Algerian personnel (in plant and abroad training),
3. Guarantee of the result - production -; and
4. Acquisition of technology.

FIRST: THE INITIAL MANAGEMENT ELEMENT

Initial management is an essential and fundamental element of plant in production contracts and for the functioning of the industrial units. It is designed that plants can function normally under Algerian personnel when they are finally delivered to NEs. In principle the duration of such management is two years, but sometimes it reaches up to 4 years under the entire responsibility of the foreign contracting party. He is required to dispatch, place his own personnel and supervisory staff to manage the plant which he has built[54].

The human resource of the foreign contracting party is doubled by that of the national enterprise. Often the contract requires that for each member of the foreign team, there should be an Algerian from the concerned NE. The advantage of this dualistic structure of management is to ensure the progressive transfer of the management of the plant, and where the tasks incumbent by the foreign firm's team are progressively transferred to the hands of Algerians. Therefore this allows the latter to substitute rapidly and effectively the former. To this extent, the dualistic structure is in fact an in-plant training of

the NE's future management team and where such team is put face to face with the different aspects of running the plant and possible implications.

Bearing in mind the different backgrounds of the two teams, conflicts and difficulties are bound to occur. However, the structure is extremely important and capital to the final reception of the plant, not because of its duration but rather because it is a channel for acquiring knowledge. The goal to be obtained from initial management, is a complementary practical training which will be added to the Algerian team's theoretical training. The advantage of such a system can only be multiple: (i) it is considered as a period in which the delay in the experimentation for the national personnel, who have been deprived of all industrial experience is shortened and reduced; (ii) it provides the NE at the end of the initial management with operational personnel theoretically and practically trained which will ensure the functioning of the plant, and (iii) it is equally appreciated to put two unequal teams - technologically - side by side, one foreign and the other Algerian. The former is contractually required to train and advise the latter and transfer to him his show-how and know-how. Thus, it is the best possible way for acquiring management techniques which are as important as the installed means of production.

However, the dualistic management has its own drawbacks. First of all there is the inadequacy between the national and the foreign team. Has the foreign partner provided a personnel psychologically prepared to transmit their knowledge to the national team? Or has the NE provided a quality personnel capable of receiving the transmitted knowledge?

Despite all the precautions taken by the two contracting parties, the weaknesses of the structure have been manifested in the enormous difficulties which foreign teams find in transmitting their knowledge to the personnel of NEs in a comparatively short period. Such short period requires a personnel well qualified theoretically in order to absorb the practical aspects.

Since the national team is contractually under the responsibility of the foreign team during the initial management and since the personnel of the former is evolved under the control of the latter, it has been noted that foreign teams have attempted to ruin any Algerian personnel with strong character and to place those with weak character in positions of heavy responsibilities. Such practices have caused certain conflicts between the foreign partners and the NEs.

SECOND: Manpower training

The training of personnel is one of the intrinsic conditions of the plant in production contract and without doubt was the major element which has influenced the Algerian planners to initiate this method of contracts in the first place. The significance of manpower training is justified by the spread of industrial development which has created more numerous and more varied opportunities for employment. Furthermore, these jobs are not only of a technical industrial nature, but by their number and diversity also create a constantly increasing demand for staff and qualified manpower in other fields. The level of qualification of manpower have not kept pace with the level of sophistication of the means of production.

Despite the increase in the number of national institutions for training and accumulating, the actual number of trained manpower remains lagging behind the required number for the production means[55]. The following table shows the gap between what the economy requires and what the combined training institutions can provide:-

**Table 5.1: The Algerian Economy Requirements for Manpower
1970-1977**

	Managers and Executives	Technicians and Supervisors	Workers(1) and qualified agents
Requirements of the Economy	67,140	94,000	243,000
Estimated personnel to be trained	60,180	48,680	232,030
Actual personnel trained	48,940	27,950	169,040
Technical Assistance	14,200	1,500	3,400
Absolute deficit (including technical assistance)	32,400	67,550	77,960
Deficit (without technical assistance)	18,200	66,050	74,560

(1) Excluding the Agriculture Sector

Source: Ministere de la Planification et de l'Amenagement du Territoire (1980) "Synthese du Billan Economique et Social de la Decennie 1967-1978" MAI p.172

Under the contractual clauses of the plant in production method the foreign contracting partner is required to train an Algerian personnel in sufficient numbers capable of rapidly substituting his own personnel when the plant is finally delivered to NES. Thus the foreign partner is

required to start the training of manpower to function the plant which he is contracted to realize. Judicially speaking, this form of training can be called an integrated technical assistance which responds to the following two conditions: uniqueness of the source of technical assistance, and the uniqueness of the judicial instrument. These two conditions are exclusively connected with the plant in production contracts[56].

Manpower training takes place either in Algeria - in plant training - or abroad in the contractor's plants.

(A) Internal training: the first operation which the foreign partner is required to execute concerns the construction of a training centre called "workshop school" "Atelier ecole" - a sort of technical college - inside the same plant which he is constructing. The centre must be an identical copy in its equipment, machinery and functioning of the future industrial plant. The trainees are required to make parts, which will be in principle destined to the production at a very high level of integration identical to that of the plant. Each centre must contain specific training for different categories of manpower under the responsibility of the contractor's personnel in order to have a corresponding technical capacity to that required by the plant. The obligation to train and prepare the different manpower categories, confer to the foreign contractor the right to recruit, select and orient the trainees during the phase of realization. Such a right stems from the undeniably importance of training and its impact on the responsibility for the whole operation.

Besides the training, the centre is also designed to familiarize the trainees with machines, thus overcoming the eventual frustration and giving them a sense of responsibility before the production stage. Equally it facilitates the promotion of trainees from one category to another. However, the training duration is a central question and raises many further questions[57]. Firstly it is doubtful whether a qualified manpower could be trained in 12 months and whether such training can fill the required condition for the success of industrialization. Furthermore, can this form of accelerated training substitute for universities in the long term.

(B) External training: As internal training is often limited to subordinate manpower, skilled manpower is massively sent abroad. The trainees are directed to the industrial units of contractor who is required under the provisions of the contract to train highly skilled manpower in his own plants (i.e. managers, executives, engineers, supervisory agents and certain specialists such as ironwork, smelting work, thermic treatment)[58].

Both internal and external training are maintained by a considerable financial effort which represents up to 10 percent of the contract's value (see Table 5.2). Such figures show the significance which national enterprises attach to acquiring technological capital through training[59].

Table 5.2: Cost for the Realization of the ENGINES AND TRACTORS**COMPLEX AT CONSTANTINE (Cost in dinars)**

Nature of the expenditure	Cost	%
Cost of establishment	33 050 000	6%
Engineering	2 900 000	0.5%
Land and infrastructure	29 500 000	5.4%
Building and civil engineering	91 141 000	16.6%
Equipment, mobile, & transferable materials	187 392 000	34.1%
Customs and taxes	83 137 000	15.1%
Building and erection	7 300 000	1.3%
Patents and licenses	3 304 000	0.6%
Tool-stock	30 000 000	5.5%
Technical assistance	26 696 000	4.9%
Manpower training	50 463 000	} 10%
Training centre	4 438 000	
TOTAL	549 321 000 (1)	100

(1) The cost of the complex was estimated to be 960 000 000 dinars in another document, see Ministère de l'Industrie et de l'Energie, "Coûts et surcoûts de l'industrialization en Algérie: le cas de la mécanique" Alger, Février 1975, p.37.

Source: Ministère de l'Industrie et de l'Energie, coûts et surcoûts de l'industrialization" Alger (Non-dated document) p.25.

The combined cost of training and the training centre in table 5.2 is more likely to be 96 million dinars^[60] rather than the shown 54.9 million dinars. This is due to the fact that as in many other cases, the actual invested sum of money is often the double if not the triple of the planned investment.

The inclusion of training as an essential element in technology contracts by the Algerian was a necessity supported by several reasons:

(1) despite the intense efforts in the field of training, the spectacular development of different economic sectors, the proliferation of new techniques have created a demand for training always higher and larger in terms of quality and quantity[61].

(2) The diversity of technological processes being used in industrial sectors at the same time was also a cause of difficulty. It rendered technical training of manpower more complex due to the option of very advanced technologies chosen by Algeria.

(3) The possibility to dispose of qualified manpower, notably the requirement of modern technology have created numerous difficulties such as the utilization and maintenance of certain systems and

(4) technical assistance provided in contracts other than plant in production is more often limited to the erection of industrial units and the start-up operation. Therefore this leaves the national enterprises with an additional technological burden, in the sense that their own personnel can not really participate in the running of the unit and forcing NEs to the recourse more and more to technical assistance to run the plant.

Thus, the element of training in plant in production contracts aims at easing the pressure on the training institutions by providing the new installations with their own personnel. More important, these new installations will have a personnel trained on the same technological processes which training institutions may not be able to provide.

THIRD: The guarantee of the result:

The principal obligation of the foreign partner-the delivery of an industrial plant - exercise a major influence on the extent of his

contractual responsibilities. Such obligation consists of four elements: delay, quality, quantity and the rate of integration. The coexistence of these closely connected and reciprocally influenced elements appear to contain certain contradictions and where the examination of one element may forceably include the others.

(1) The delay in the realization of industrial units: The agreed delay period depends on the importance and the scale of the project, and the maximum allowed delay run-up to 5 years. The 5 year maximum delay is based on a principle which has a profound significance and ambiguous interpretation. Profound significance, because the delay in the realization of industrial project is tied to the political project - the will of transforming the Algerian society. The latter suffers the consequences whenever the former is prolonged, since the latter is nothing but several technical projects executed by the national enterprises and other economic agents.

Ambiguous, because each of the contracting parties has his proper interpretation of the contractually fixed delay. The examination of the delay in relation to NEs shows on one hand that the fixed delay is an option of buying rapid industrialization. Thus it obliges the foreign partner to execute promptly the industrial projects in order that the plan's objectives are realized. On the other hand, it is implicitly considered as a means of pressure on the foreign partner, in order that the latter carries-out the works in accordance with the terms of contract.

In contrast, the assessment of delay in relation to the foreign partner reveals that the primordial reason for him is to avoid sanctions

if the realization of the project was delayed. The result of this equivocal interpretation is that the fixed delay appears to have been used as a means which materialize in practice by a hurried work method where mistakes and malpractices find their origin.

(2) The quantity and quality elements: The contract's result - final delivery - is equally based on the capacity to produce a fixed quantity and quality of products. It seems that this contractual requirement is delicate to execute in practice, since no harmony appears to exist between the three elements: delay, quantity and quality which are conceived in an incoherent manner. If NEs need is to acquire the quantity of production, it is improbable that the fixed delay will be observed and that the quality be of the same nature as in the industrialized countries. If the priority is given to obtaining quality, the fixed delay may be exceeded and the quantity may not be reached. Further, if the element of delay is accorded the priority, both the quantity and quality would have to suffer. It seems that a success in the three elements at the end of the 5 year period is quite impossible to obtain and as a consequence a priority choice is imposed.

The question of delay in the present context is not a determining factor except in dividing financial responsibilities among the two partners; a delineation between the financial responsibilities of NEs and their foreign partners. To my mind the pursuit of the element quality is a false solution at least in a short term. If the volume of production and the quality of the trained personnel are left to be as desired, the quality of the product can later be obtained. The

observation of the fixed delay in the context of Algeria, is in many cases, a disguise of future breakdown of the constructed plants caused by the malpractices and mistakes during the hurried realization in order that the timetable for the final delivery can be met.

As far as these three elements are concerned the method plant in production attempts to obtain results which are obtainable in the industrialized countries in twice the fixed 5 year delay period and that has proven to be too ambitious to obtain.

(3) The rate of integration: National enterprises incorporate in their products a rate of integration comparatively superior to that which exists in the industrialized countries. Such high level of product integration is fundamental in the negotiations of plant in production contracts. Before we assess the implications of such a strong rate of integration we need to define what is meant by rate of integration.

Under the terms of the contract "PIP", the constructed plant must manufacture products with a minimum of 70% local integration from the start-up operation. The foreign partner is required to provide in the same industrial complex for the manufacturing of subset products, even when those subset products are not manufactured in their own plants. The plants of NEs fabricate all the mechanical parts in accordance with a list provided for in the contract. When the listed parts are produced, the proportion of local productions is considered to be reached. The limit for reaching such level of integration is the same as that of the final delivery of the plant.

A second level of integration consists of local sub-contracting. A catalogue of mechanical parts which the constructor is obliged to buy from Algeria. Such catalogue is only minimum and liable to extension whenever the required parts for the plants become locally produced. Theoretically, this is based on the import monopoly power of NEs which allows them to block the importation of those parts which are locally produced.

The two fractions of integration-plant and local sub-contracting - constitute the national rate of integration. At the present the latter has not reached the 100% mark. In fact, mechanical parts which are neither produced by the constructed plant, nor by the other NEs due to the actual state of the Algerian industry continue to be imported. Their importation is taken as a temporary complementary measure until other industrial branches progress. It is certain that the 70% rate of integration required by the national enterprises is comparatively higher than that applied by certain foreign firms. For example, the French car company Renault requires only a rate of 50%. However a comparison of this type is quite misleading, since the higher rate in the case of the Algerian enterprises is designed to substitute for the lack of national sub-contracting, which is in contrast completely the opposite for foreign firms where sub-contracting to firms in their own countries is available.

The significance of the high rate of integration in the plant in production method is fundamentally politically motivated. It is explained in two ways: on one hand it shows the constant concern of the Algerian authorities to liberate the national economy from foreign

dependence. On the other hand, it is a manifestation of the will to industrialize through the production locally of at least 70% of the final product.

The effects of the rate of integration are hoped to place NEs in a position where they will not have to maintain any connection with international sub-contracting, and thus to escape external pressure with regards to spare parts. However, it is imprudent to think, at least in the short term that NEs can escape external subordination, for reasons of their increasing development which necessitate a constant recourse to multinational corporations. Nonetheless, the high level of integration or method of independence can materialize for the long term, which is probably what the Algerian planners have in mind as an objective.

Finally, the NEs by choosing a high rate of integration search to make industrial plants function at full capacity to provide supplies for each other. The implicit objective of such a policy is to stimulate the creation of more jobs.

FOURTH: The acquisition of technology: As it was explained in Chapter four, the acquisition of technology in the experience of Algeria is not based on the mere acquisition of codified technology (i.e patents, licenses etc.), but more significantly on the training of manpower to understand and put such codified technology into useful application. For example, the cost of licenses and patents in the Constantine's Engine and Tractors complex was only 0.6 percent of the total cost. while the cost of training was 10 percent, or sixteen times the cost of patents and

licenses (see table 5.2 above). This is not to mean that patents do not play a significant role in the technology acquisition policy of Algeria. On the contrary the Planning Ministry has calculated that for the 1973 alone, 200 million dollars had been spent on patents, know-hows and engineering. Such a figure when compared with 1500 million dollars spent by the other developing for the same year on the acquisition of technology from the industrialized countries, shows that the share of Algeria was 15%, and that can either mean that Algeria is buying more technology or paying more than the other developing countries[62].

Both propositions can be held true, since on one hand, industrial investment efforts in Algeria are higher than any other developing country. On the other hand, the high cost is attributed to other factors such as the option of advanced technology and the methods of its acquisition which resulted on a heavy relying on technical assistance. More recent information indicates that the combined cost of patents, licenses and manpower training represented only 20% of the whole cost of the foreign technical assistance between 1973-1978[63]. The tasks of technical assistance in Algeria are numerous, and cover all the aspects of Algeria's industrialization from feasibility studies and even beyond the production phase in the form of maintenance and repairs intervention (see ANNEX 5:6). These additional factors certainly generate a higher cost than in other developing countries.

Under the method turnkey contracts, Algeria reached the conclusion that the acquisition of machines and licenses, though essential for the fabrication of products - was a false illusion of technology transfer,

and that technological capital was more vital, if its industrialization policy was to succeed. Such technological capital lies in the close relationship between men and machinery which develops only through a very large long-drawn-out process. The introduction of plant in production contracts was specifically designed to deal with such relationship and at the same time attempting to shorten the process.

Despite the fact that certain parts of know-how have been condified, it remains attached to the behaviour of experts and technicians. Accordingly, it is difficult to transfer information whether written or verbally without a concrete work and more commitment from the know-how supplier, which is translated in the case of Algeria into a contractual obligation. In the framework of national enterprises, the plant in production method provides the following types of know-how. First, the contractor provides the following types of know-how for the functioning of the plant. Each plant is equipped by its own training centre and the personnel of the constructor is contractually responsible for the training of the national personnel, and to teach them the practical conducts to adopt the necessary precautions. The outcome of this coupling is the oral transmission of experience conceived abroad, which completes the acquisition of equipment. Simultaneously, and at least theoretically it allows the national enterprises to utilize with an optimum, the techniques of their plants and to ensure their technological autonomy.

The second is the know-how concerning the management of industrial plants, which is relatively easy to transfer. Since the initial management, in its dualistic form, backs the NES personnel and works

towards this objective, it is foreseeable that the industrial units transferred under the plant in production contracts will probably be managed in the long term according to the same methods and rules as applied in the industrialized countries.

No one can doubt the impact of plant in production contracts on NEs which have applied it. It succeeded in transferring a variably important technological content. The main cause for such a desirable impact is that the foreign partner is contractually obliged to produce products by the means of his own inventions or those which he gathered for the benefit of NEs, to proceed in the execution of certain unknown techniques in Algeria, and to assist through the intermediary of his own personnel in the acquisition of such techniques.

It is yet premature to appreciate the full impact of plant in production "PIP" contracts which seem to be favourable to the case of Algeria. Nonetheless and even when it seems to have an impact at the technical level, it has not solved the immense problems of technology transfer. It is certain that the application of the plant in production contract depends solely on the foreign partner who is given the entire freedom for the realization of the project. Since the foreign partner is in fact a coordinator or representative of several firms it is quite impossible to list all the difficulties and drawbacks. But nonetheless, we can establish a certain negative aspect common to all the plant realized under this contractual form.

(1) The plant in production is a method of exclusion for the concerned national enterprise. After the signing of the contract, the foreign partner becomes responsible for all the phases (conception, realization,

start-up and the period of initial management). These phases take place under his unique responsibility, and therefore excluding national enterprises from all the following operations, which are conducted under the authority of the foreign partner alone:

- He is responsible for engineering works, and he establishes all the necessary plans and documents for the creation of the industrial plant;
- He proceeds in the definite laying out of site including secondary installations and annexes;
- He determines what are the proper machines, equipments and workshops for the plant;
- He buys and transports the necessary equipments by his own proper services;
- He sets up the installations and proceeds in the start-up operation by his own experts and technicians;
- He organizes and coordinates all the elements of the plant;
- He selects, trains either in Algeria or in his factories abroad of all the categories of personnel.

These stages though limited in their number, hardly indicate the participation of NEs in the realization of their future industrial units. The compensation for allowing all the decisions to be taken by the foreign partner consist of the guarantee that the result will be obtained regardless of the difficulties faced by the foreign contracting party. However, such guarantee of the result can be negative if the control has not been exercised by the NE from the start of the industrial operation.

The problem which is imposed here is, to whose interest are the decisions taken? Certain personnel of NEs insisted that the materialization of industrial units is concluded in the interest of the foreign party. Many other foreign experts share the same view, which is in a sense logical and it would be unwise to expect otherwise. Others maintain that the interests are balanced.

Whatever the appreciation of interests, the effective control by the foreign partner and the absence of control from the client NE has created problems from the beginning in matters of technology acquisition, especially in the field of plant erection. It is true that the NEs through their consulting engineers have the right to check the installations, but such right remains limited since it is exercised only after the completion of the erection. Moreover, no Algerian personnel is integrated in the realization process. It would have been far better for the Nes to have attempted to acquire the techniques of the setting up of equipment and machinery rather than to claim being the master of the plant once it is being realized.

(2) The plant in production method is an illusion. It delegates power to the foreign partner to realize the industrial paradise of the NEs. Contractually, it requires a party to the contract to do what the other cannot do for himself. This vision contains an illusion; the illusion is the result of the vision of those who ignore the mobility of multinationals and instinct action of imitation. The illusion grabbed by the individual when he assesses that the plant is physically similar to that existing in France or West Germany for example, function in an identical manner to that in the industrialized countries.

No foreign company can guarantee the industrial well-being of someone else, even when it's under constraint of contractual clauses. What is the significance of a contractual clause in a completely disadvantageous climate which ignores all the processes of industrial realization? What is the significance of penalty clauses, when the cost for such penalties is anticipated in advance and included in the contract's cost. Those guarantees, no matter how important cannot compensate for the lack of control and the capacity to intervene in the realization of industrial units.

(3) The method plant in production appears to have negatively affected the national personnel. It is in particular the high qualified category which feel unhappy about the method. Such feeling is caused by certain contractual provisions of the plant in production. Firstly, certain personnel of NEs have complained that considerable power and means are available to the foreign partner to dissuade the Algerian personnel of all negative critiques of his work. Such a power is derived from the fact that the foreign partner grades the national personnel during the realization stage. He is also responsible for their selection and awarding of the different functioning posts in the plant. He proposes the training and the promotion. Thus to oppose him or even to notify errors may not be that easy from the national personnel because of fear of retaliation which would effect their future in the plant.

The second is intrinsically to the plant in production method which does not imply at all the personnel of NEs in the success of the plant. Therefore, a number of personnel feel that the success of the plant does

not really depend on their commitments and that the method isolates them from start to finish. The extent of such feeling have led to the refusal of responsibility as a reaction against a situation of exclusion. In order for the national personnel to take interest in the realization process, such personnel instead of having their action objectively limited by PIP should be given the initiative.

The third cause relates to another section of the personnel which are easily contented from the signing of the contract assigning a foreign firm to construct an industrial unit in the country. Such section, comfortably find a feeling of satisfaction in the contract, a feeling arising from the sense that the result of the industrial operation is assured; Thus, manifesting too much confidence in the foreign partner.

(4) The method plant in production is costly. It can be said that this contractual form makes the cost of investment heavier. However, when one takes into account the advantages, which unlike the other contractual forms make sure that the industrial units can be effectively operational at the time when they are handed over to the Algerian personnel. For such an assurance, the method embodies an element of overcost. It is the price paid by Algeria for ensuring the industrial security of its industrial projects. The proponents of the system argue that one cannot accept on one hand the system for the security it offers and on the other hand criticize it for its consequences.

But is the cost really high? At first, it appears to be so, when compared with other forms of contracts, in particular turnkey contracts.

However, the facts are different since the deviations or faults separating the cost of the two contractual forms consist first of all of the fact that a plant in production contracts contain allowances and supplies which are not included in turnkey contracts. The former includes supplementary supply of spare parts, certain raw materials, and above all a more comprehensive commitment concerning the training of production and management personnel which gives rise to complementary payments. The question to be asked is whether or not the supplementary payments included in the plant in production contracts are economized in the turnkey method. Certainly this is not so, because they are simply the subject of additional contracts. The only difference to be seen is that under the plant in production, the foreign contracting party assumes the responsibility of the results which are left to the national enterprise under turnkey contracts.

One also must bear in mind that the foreign contracting party, under the constraint of delays of the realization tends to increase his price and includes a marginal price to cover risks of delay and sub-contracting in particular to national enterprises. He also tends to favour supplies from his own country without due regard to the price offered by firms from other countries. He is likely to take financial precautions against inflation and other unknown factors when formulating the global cost of contract. In return the NEs is legally protected by a contractual guarantee situated between 5 and 10 percent of the contract's cost in cases of delay, malpractices, non-functioning, non-performance as well as the quality and quantity of both products and trained personnel.

Despite the guarantee of the result, the cost of the plant in production contract remains excessively high. It is estimated by certain experts that for the cost of each plant in production contract, three turnkey contracts can be provided. To show the excessive cost, the Ministry of Industry and Energy, estimated that the cost of building an identical complex in France to the ENGINE and TRACTORS Complex at CONSTANTINE would amount only to 273 300 000 dinars. Or third of the cost if one takes the actual investment in the Constantine Complex and half the cost if we only consider the planned cost (Compare Table 5:3 to 5:2).

The comparison between the two tables shows that in every expenditure, the foreign partner has charged the NE more, particularly in technical assistance, equipment, building and civil engineering. The only exceptions are to be found in the cost of (i) patents and licenses which is twice the cost in table 5:3; (ii) the cost of building and erection which would have been three times the amount had the plant been erected in France; This is due to low labour costs in Algeria as compared to France, and (iii) The cost of engineering including feasibility studies is also six times higher in Table 5:3. However, the low cost of engineering in Algeria is a tactical strategy used by the foreign firms to get attention to their bids for contracts. For example, in the phosphate fertilizers complex at Annaba (a turnkey contract), the Ministry of Industry and Energy found that the French firm KREBS has included in its bill 8 278 000 dinars for the services of engineering, while in fact the expenditure was at least 25 000 000 dinars^[64]. This does not signify that foreign firms are voluntarily prepared to provide engineering services at a lower price in order to obtain contracts, since such cost is concealed in the other expenditures.

TABLE 5:3: Estimated Cost of an Identical Complex to the ENGINE
AND TRACTORS COMPLEX AT CONSTANTINE
(Constructed in France) (Cost in Algerian Dinars)

Nature of the expenditure	Cost	%
Cost of establishment	28 000 000	10.25
Engineering	20 000 000	7.30
Land and infrastructure	9 000 000	3.30
Building and Civil Engineering	45 000 000	16.45
Equipments	130 000 000	47.55
Building and Erection	25 000 000	9.15
Tool-Stock	6 500 000	2.40
Patent and licenses	3 300 000	1.20
Technical Assistance and Training	<u>6 500 000</u>	<u>2.40</u>
TOTAL	273 300 000	100%

Source: Ministere de l'Industries et de l'Energie "couts surcouts de l'Industrialization" op. cit. p26.

Whether or not the guarantee of the result can justify the high cost of plant in production contracts is a matter still open to debate in Algeria. However, one apparent thing is that, the method appears to have limited international competition and confined it to a restricted number of large firms. The method, by the nature of its obligations is exclusively reserved for multinationals. To confine all the tasks of

realization and functioning of the plant (i.e. engineering and training etc) to a single contracting party seems to pose multiplying questions to the foreign firms competing for contracts. It has discouraged small and medium size firms who may have a high level of technological competence in certain industrial sectors. These firms may not be in a position to respond to the requirements of the plant in production contracts, for gathering the necessary civil engineering and training of personnel, let alone the capacity to coordinate the activities of up to six firms. Even the large firms who accept the requirements of this contractual form, practice sub-contracting at a very high level (mostly from companies of the same origin).

There is no doubt that the global cost of plant in production can be reduced if only a more positive role can be found for the national enterprises, especially in the negotiations between the foreign contracting party and sub-contractors in matters of equipment and machinery prices as well as other services. Until Algeria acquires the necessary technological capital, I favour the option of paying a slightly increased price for a plant in production contract rather than to end up with all the hazards left to NEs by the method of turnkey which could turn the whole industrial project to a disastrous failure. The problem here is not the choice between the two contractual forms, but to what extent each of the contractual forms will make it possible for the Algerian enterprises to replicate the plant. In other words to reproduce the imported technology in a new plant by own means.

To sum-up, the plant in production method converts an obligation of means into an obligation of results, and that the marginal price for the

assumed risks is not an arbitrary one if it was coupled with more provisions allowing for the participation of the NEs. Due to the technological incapability of national enterprises, the marginal price is a part of negotiations process which the NEs cannot do without at the present time.

(5) The plant in production contract is a packaged form of technology acquisition, and as such it implies technological dependence. Regardless of the contractual method, technological dependence already exists in two forms: (i) The need to import technology (i.e. machines and licenses) though commonly traded in the industrialized economies, it remains in the case of Algeria and for sometime to come a one way traffic; and (ii) Algeria as a developing country with no technological capital need to import the ability to utilize and apply the imported technology (i.e. consultant services and technical assistance).

The existing technological dependence when tied to plant in production contracts produces a double dependence. First, the training of manpower and the initial management furnish the basis for the beginning of a durable technological dependence. On one hand, national technicians and personnel are subjugated to foreign firms, to its methods of action and reaction, and more largely to the occasion of the training abroad, or what can be called the "Western way of life". On the other hand foreign firms do not hide the fact of implicitly using the training to exclude competitors.

"For us, the training is nothing but the tuning on the machineries. Thus, it would be a pity if we do not provide it, because it helps us selling our products. The higher

the training is, the more expensive and elaborate machineries we sell. By training people we sensitize them to our norms, which later makes it easier for them to turn to us rather than to our competitors" [65]

Moreover, the training, a vital question and central to development seems to be insufficient and inadequate. The personnel seems to have knowledge of functioning the machines without being able to face serious incidents. In other words, their training is limited just to the functioning of the plant and to assure its production.

Second, the engineering department "Bureau d'etudes" which is the brain of all innovations and modifications of products and processes. It can be called the national enterprise's specific technological knowledge, or the ability to use general technological knowledge in developing and operating specific industrial activities[66]. Engineering departments are almost non-existent and without structure, and at the present time they represent no more than a belt of transmission of the foreign partner's engineering to the NEs. Their present position does not allow them to contribute towards innovation, which inevitably leads the foreign firms to continue to be the technology supplier to NEs and remain the master of technological innovation. Since engineering is weak within the context of NEs, the accumulation of the construction experience belongs to the recruited foreign technical assistance hired from foreign firms. It is likely that the information of the experience will be relayed back to their own firms to be used in R & D activities. In other terms, the relying on foreign engineering provides the concerned foreign firms with a free channel for the technical knowledge gained from the Algerian

experience. Such knowledge then becomes centralized and monopolized, and sold back to the NEs reproducing technological dependency.

The lack of strong engineering can be explained on one hand by the hazards resulting from the realization, and on the other hand, from the fact that no priority is given to engineering in the plant in production contracts[67]. It is only during the present Five Year Plan 1980-84 that engineering is given the place it deserves[68]. One of the factors contributing to the lack of interest in engineering is the fact that the foreign contracting party in the plant in production contracts is required to communicate to the NEs the technological innovation he applied in the plant.

In return the NE shall not, for ten years from the start of production, modify the products manufactured under license nor disclose the technical details of the plant and its processes except with the prior consent of the foreign partner. From the few contracts I was able to see, this restriction applies even to other national enterprises. This means that the same process or technical information can be bought by different NEs from the same technology supplier.

In reality the question of technological innovation cannot be faced in the first decade of the plant. The intensity of this question will be faced when the ten years period expires. From then on, the existence of a well structured engineering department becomes a necessity, in order that it might bring changes to the product's characteristics. It is

almost certain that the engineering departments of NEs cannot fill such a task, neither at the present time nor in the near future. It follows that the NE cannot possibly know about the technological changes concerning its products. Thus, they would be forced to conclude technological contracts with the same contractor who had accumulated the experience, in order that its products will not be out-dated. In this sense, the continuity of technological dependence is assured, since on one hand the NE is assured of new inventions. On the other hand, the foreign partner is guaranteed that the products of NE are not modified outside his own technological circuit.

To conclude, the plant in production contract, ties the national enterprise technologically to the foreign partner for a longer period. Also it appears that, too much confidence is being placed on the foreign partners. In my view, there are limits to what the foreign partner can and cannot transfer to NEs. In principle, technological elements written or physical do not suffer from any limitations except: (i) When the technological element belongs to the contractor, it is doubtful whether he will be prepared to transfer such an element; (ii) Certain technological elements may belong only to one or two multinationals. These elements constitute an element of power and negotiations and their transfer is unlikely.

Another element of continuous technological dependency, which the plant in production totally ignores, relates to the question of spare parts[69]. The problem is not of supply, since the supply of spare parts is guaranteed for at least two years after the plant comes into operation by the foreign partner. However, this relates to the fact that

the national personnel are trained to acquire the knowledge of the external functioning of machines which they operate and not the knowledge of the composition of machines and especially their inner functioning. In other words, foreign partners are contractually required to transfer the technology concerning the production of one article (i.e. the fabrication of tractor) but not the technology concerning the imported machines which produce the tractor. As a result the NEs continue to be dependent on the foreign partners for their spare parts and their technical assistance in cases of breakdown and even maintenance.

4. Mixte Enterprises

Since foreign investment is interested in financial return, Algeria had decided in its early stages of development to do without direct private foreign investment. And thus, has transferred to the newly created state-owned companies the full responsibilities and all the risks of its industrial future. Such policy was outlined by the late President Boumediere in 1968 as follows:

"We cannot, at any time, collaborate with the exploiting foreign capital. Any other position would mean poverty and destitution. We have undergone in this field, an experience that ended in a failure, because the foreign capital, despite the facilities and guarantees that were granted to it could not rid itself of its two effects: exploitation and fear. [....]

This is why in the light of our experience, we have founded our policy on a strict cooperation with the foreign partners who accept it within the framework of our fundamental options and revolutionary

orientations [....] Therefore, the foreign capital can only play a complementary role, according to clearly defined conditions that inhibits it from exploiting our country's economy[70].

A striking example of Algeria's refusal to cooperate with direct foreign private investment, unless the conditions are acceptable to Algeria, is the Ammonia and Ammonium Nitrate Complex at ARZEW[71]. The complex was originally sought to be realized in association between SONATRACH and the French company, the Societe Nationale des Petroles d'Aquitaine "SNPA". However, the conditions required by the latter were considered to be outrageous by SONATRACH and thus it was rejected.

Since independence, Algeria expressed the desire to install a petrochemical industry in the country. French companies in this field did not hide their opposition and put forward a less convincing argument based on: (1) world production of petrochemical products is already high and since the prospects in Algeria are very limited, Algeria could not possibly compete in this field with products from the industrialized countries, (2) the local market is too weak to absorb the output, and (3) there is a shortage of specialized manpower in Algeria and that could only increase the price of products.

As soon as the decision to construct the Ammonia complex was made public, foreign firms in the field could not accept that such a plant could be constructed in Algeria without being under their control and management. At first, the representatives of the Office National des Industries de l'Azote Francaise "ONIA" and the SNREPAL of France proposed to the Algerian authorities the construction of the plant where the

capital would be shared by SONATRACH on one hand and ONIA and SNREPAL on the other hand. Unfortunately the negotiations only confirmed the hegemonist intentions and attitudes of both ONIA and SNREPAL. Among other things, they required in particular that: (a) the Algerian Government would not authorise the construction of other similar plants without the prior consent of the two firms, (b) the proposed capacity should only be 400 tons a day rather than the 1000 tons advanced by Sonatrach. The French companies accepted the fact that the low production capacity would mean high prices for the products, but the representatives of the two firms suggested that such high prices could be supported by the Algerian agriculture; and (c) they also required that their monopoly over export and commercialization of products should be recognised, which means in practice the control and management of the enterprise[72]. These proposals were rejected outright by SONATRACH.

Once more, Algeria understood that it must count on its proper forces. Thus, after a precise technical and economical studies, SONATRACH launched the construction of the project[73]. These studies were jointly conducted by SONATRACH and SNPA, the latter has proposed to the former on April 6, 1966, the setting up of an industrial pool in the ARZEW area which will include: an LNG complex with a capacity of 6 billion cubic meters a year; an Ammonia plant (1,000,000 tons a year); Ethylene plant of 50,000 tons a year. To convince Sonatrach to launch such an industrial operation, the representative of SNPA indicated, that the preliminary studies conducted by its engineering services had arrived at the conclusion that such operation should provide excellent profitability, because of Algeria's rich hydrocarbon resources and its geographic situation put it in a position where it could provide petrochemical products at competitive prices.

Despite previous let-downs by French companies, SONATRACH accepted in principle the launching of such operation, hoping that these companies might have finally understood that it was necessary to maintain a new era of cooperation with Algeria. SONATRACH'S hopes were suddenly swept away when, around the end of June 1967 and while both SONATRACH and SNPA were still conducting further economic and technical studies to determine the precise conditions for the realization of the industrial pool SNPA made it known that the realization of these projects no longer interested it. To explain this decision SNPA put forward the following arguments:

- (1) The Algerian-French agreement on the sale of Algerian liquefied natural gas to France of June 15, 1967, calls for the creation of a mixte enterprise between SONATRACH and ERAP (50% Capital participation for each) called SOMELGAZ, implicitly exclude SNPA from Gas liquefaction[74].
- (2) The SNPA is not specialized in Ammonia products; thus it seems preferable not to venture in this field which it does not know about.
- (3) The chosen production capacity for ethylene is very low and could only lead to higher prices. Moreover, world production of ethylene is quite high and dumping prices are currently practised.

The argument advanced by SNPA is no more than a pretext put in advance to explain the sudden withdrawal. The truth of the matter was that SNPA had decided not to collaborate anymore with SONATRACH, when it became apparent that the latter has decided to have majority capital participation in the mixte enterprise to be purposely created to run the

plant. As well as to keep the monopoly to commercialize the products within SONATRACH, the arguments put forward by SNPA could not be supported by other relating facts: (1) Certainly, the Algerian-French agreement on the sale of LNG to France calls for the creation of a mixte enterprise SOMEELGAZ between SONATRACH and ERAP. Such agreement did neither explicitly nor implicitly exclude SNPA from gas liquefaction, since SNPA is no more than a subsidiary of ERAP and at that time the two firms had the same chairman. After all the two companies ERAP and SNPA could be classified, either as two sister companies with an identical interest or two distinct companies with totally different interests, depending on the argument one needs to develop. (2) If we were to believe SNPA that it was not specialized in ammonia products, how could the company explain: that it was originally responsible for suggesting in the first place to Sonatrach the construction of the ammonia and nitrate plant?; jointly conducted with Sonatrach the technical and economical studies? and even conducted its own studies before any initial discussion took place with Sonatrach. (3) Certainly the production capacity of 50,000 tons of ethylene a year was relatively low but let us not forget that such capacity was calculated in accordance with the joint studies of which SNPA played a significant role. Moreover, it was the representative of SNPA who refused to consider seriously a higher production capacity, advocating the narrow local market and high production of ethylene worldwide. (4) If world production of ethylene was as high as SNPA claimed it to be, and had reached a level where dumping prices were practiced, how come that existing facts were indicating the opposite. First, the same company SNPA was at that time carrying a feasibility study for a petrochemical project in Libya[75]. Second, ERAP, the parent company of SNPA was contemplating to double the

production capacity of the steam-cracker of Feyzin in order to be able to produce ethylene from petrol. Third, the claim of dumping price[76], is also contradicted by the fact the Compagnie Francaise de Raffinage and the companies SHOLVEN CHEMIS and CHEMISCHE WERKE HEILE had decided in 1968 to construct an important complex of polyethylene at the Havre[77].

Faced with these demands and lack of cooperation, Sonatrach decided to set-up the project without any private foreign investment at all. The foregoing manipulations by the French companies were by no means the only obstacles faced by SONATRACH in setting-up the ammonia and nitrate plant. To cover for its financial handicap, Algeria submitted a request for a loan to the International Bank for Reconstruction and Development "IBRD". After the Bank's experts visited Algeria, the loan was refused on the grounds

"that Algeria would first have to produce a contract of sale of the products to be manufactured by the plant, which at the time was considered too large for the need of Algeria, whereas once built solely with national financing, the same is not even sufficient to meet half of those needs"[79].

The Bank's attitude was seen by Algerian officials as a confirmation of being an instrument of the major powers which finance it, and designed to cause the failure of the country's socialist experiment. According to the Industries and Energy Minister, the articulated technical form of rejecting the request was a "profoundly disappointing and in many aspects dangerous"[80] and "discriminating"[81]. The truth is that the IBRD

up to 1972 was unwilling to finance industrial projects in the public sector. The Bank's advice to Algeria was against setting up heavy industries, on the grounds that Algeria's need could be met by the already established capacities in the industrialized countries. A senior Algerian official said that the Bank did try to influence policies, but Algeria insisted that it could not be pushed around[82].

Though the hostility of IBRD to financing the public sector played an important role, the refusal of the loan was mainly motivated in this case by Algeria's refusal of capital participation from the French firms. According to the Chairman of SONATRACH "The Bank refused to intervene if Algeria does not accept the foreign private participation"[83]. The IBRD's objective was clear: to force Algeria to the allegiance towards capitalism, and to make it turn to private foreign capital for financing industrial projects[84]. However, the Bank's policy of not lending to Algeria had no effect either in forcing Algeria to change its industrial policy, or to accommodate private foreign investment[85].

The lack of local technical capacity in particular, and foreign exchange in general, whatever the degree of mobilization, could not have assured the realization of industrial projects. As far as finance was concerned (in terms of foreign currency) Algeria's political stability and its oil and gas revenues have made many countries and financial institutions willing to lend it money[86]. In any event, much of the public enterprises investment is financed by domestic saving and not more than 24% during 1975-1980 was foreign financing[87].

As to the local technological capacity, Algeria resorted to the association with foreign firms. Such association was limited to certain industrial activities (i.e. drilling, engineering, plant's construction) [88] with at least 51% capital participation reserved to the national enterprises, "Whatever form retained, the investment share of the national enterprise SONATRACH must be at least 51%" [89]. Under the investment code of 1966 [90], which consequently ignores the question of capital participation, foreign capital could either invest in industries or tourism [91], and all other fields were excluded from the application of the code. Although private capital, foreign or national can invest in both industries and tourism, this does not mean that it can enjoy a total freedom of intervention in these branches. The Code, under Article 2 provides that "The initiative for effecting investment projects in vital sectors of the national economy belongs to the state and its dependent organisms" [92]. Even when the intervention of private capital does not involve the vital sectors, it is up to the Commission Nationale des Investissements established under Article 27 of the code, to decide on applications.

In the context of Algeria, two types of mixte enterprises can be distinguished. First is the engineering enterprise. Any developing country which aims at obtaining the necessary technological capital can either establish its own engineering enterprises; such option requires an enormous qualified manpower which Algeria does not have at the present time. Or, to have an association with foreign engineering companies. In many cases, this mixed engineering enterprises are designed to compensate for the exclusion of national enterprises from participating in the

realization of industrial plants under both turnkey and plant in production contracts. The integration of the national teams with the foreign engineering teams aims at least to achieve what the initial management of plant in production has achieved. Nonetheless, the transfer of know-how can only be realized progressively and that such progressive transfer is only possible when there is a real participation in the conception and realization of industrial units by the two teams. It is doubtful whether foreign partners would really contribute to the development of their competitors. This form of mixed enterprises is by far the most practiced one in Algeria[93].

The second is the production enterprises. Production enterprises can be considered as a step further towards technology transfer. It is based on the assumption that in return for the local market, raw material and human potential provided by NES, the foreign partner will be well placed to transfer his technological elements (patents, know-how, personnel and equipments). This form of mixed enterprises is used in particular by SONATRACH in the field of hydrocarbons (i.e ALFOR, ALGEO, ALFLUID, ALTEST) [94].

In practice, the recourse to joint ventures is a recognition of Algeria's technological incapability and a widening of dependency. The presence of the foreign firms as partners is because of their services and it is for this same reason, it is unlikely that these firms would allow the national personnel to master the technology being used in the joint venture. To do so is to contribute to their own disappearance. Accordingly foreign companies (almost all MNCs) are known to have used a

technique called double agreements. Under this there is an association agreement as well as a second agreement concerning patents, licenses and management. The latter agreement, through which technological assistance is provided, is drawn up in a manner where it would cease to exist in cases of a serious disagreement concerning the former.

To sum-up, the contractual methods and their evolution confirm beyond any doubt, the weakening of any possibility of mastering the imported technologies. The evolution shows a clear crossing from one form to another, and where the tendency was as follows:-

(a) A net increase of turnkey contracts during the first Four Years Plan 1970-73, such an increase continued to rise and more than doubled in the second Four Years Plan 1974-1977, where it reached 59 contracts compared to 25 in the previous plan. This increase may not have happened had the national enterprises been able to persuade more foreign firms to be a party to the newly introduced plant in production form of contracts. As a result only one plant in production contract was concluded in the 1st Four Year Plan and 16 in the 2nd Four Year Plan (See Annex 6:8).

(b) The tendency also shows a slight reduction in the number of supply and plant erection contracts from 33 contracts in the 1st Four Year Plan to 21 contracts in the second Four Year Plan. However, such reduction was expected, since equipment's supply and plant's erection are fundamental elements in both turnkey and plant in production contracts.

As we cross from one contractual form to another, it becomes more evident that these forms are a clear manifestation of neutralizing the

potential qualified manpower (see Annex 6:10). The evolution of contracts shows that it is in fact opposed to the declared technological policy of Algeria. Such policy, as we have seen in chapter four^[95], assumes that the building of industrial units and the coping with innumerable problems arising through the construction will in the end provide the quickest most dependable way of acquiring technological know-how and inventiveness which are the true components of technological capital. But how can such technological capital be acquired, when the national manpower is excluded by virtue of turnkey and plant in production contracts from the phase of construction? It is true that a significant number of industrial projects have been realized during the period 1967-1979, reaching a total of 459 projects (see Annex 6:9). But the intervention of the realization of these projects is very limited (Annex 6:10). Despite the enormous efforts and investments by Algeria, the country does not actually have a single team which is capable of reconstructing anyone of the industrial units already realized^[96] (as in the end of 1978).

To acquire technological capital, a high level degree of coordination and intersectional harmonization is necessary, and can only be assured by an effective cooperation of national economic agents in unitarian coherent framework. It also calls for the setting-up of an institutional framework, which would develop mechanisms allowing for the establishment of firm and best conditions for the framing of relations and negotiations with foreign firms. At the present time, the lack of a clear policy of accumulation of experiences and the lack of an institutional framework have contributed significantly to the existing problems.

The policy is also based on the assumption that mistakes in the management of projects and production units, however costly they maybe, steer the national enterprises towards the core of technological difficulty and enable them by relying on national means to break down the technology into components which are easier to grasp. Once it is broken down into its components, the term technology - so frightening at the outset - is reduced fro factory workers to a certain number of clear and attainable objectives[97]. The transfer of technology does not consist only of the purchase of patents and licenses. Such purchase corresponds, at most, to the right to understand, but not to use the technology. A patent document, which may be sufficiently clear to an experienced manufacturer is of no practical use to the national enterprises who has then to spend yet more money and sign more contracts in order to obtain technical assistance, skilled personnel, and know-how. Equally, the transfer of technology does not mean the mere physical transfer of industrial plants as they exist in the industrialized countries, which turnkey contracts attempt to achieve.

Any real transfer of technology ought to include (i) production and maintenance know-how, (ii) managerial organization and plant expansion know-how, and (iii) product design and innovation know-how. Certainly to acquire such necessary know-how is a very long term objective of Algeria, it cannot be developed or acquired within a prefixed period of time as the history of the industrialized countries shows. From all the contractual forms, the plant in production - though not without criticism - is the only form so far which comes close to any real technology transfer. Although this method is costly and long, it seems to be the

only possible way for Algeria of breaking into the technological world and for which the efforts involved cannot be shifted to anyone else. As to its cost, in the long run the price paid for acquiring the technology embodied in it will be sum total of costs accumulated through the process. If used sensibly, plant in production method would have a more positive impact than it had so far. If an Algerian team could co-exist with a foreign team during the initial management, it is possible that when the former takes charge of the plant, another team would replace it. In other terms, the trained management team, while running the plant, could at the same time train another team. The same would apply to the "workshop school" provided under the plant in production contracts. However, the usefulness of this approach may be limited to the same industrial branch or branches using the same machinery and technologies. Equally, it would reduce the massive sending of Algerian trainees to the industrialized countries in connection with the signed contracts, which has not been efficient. It has neither been profitable in comparison with the committed expenditures, nor from the point of view of the training's content. Such training in the industrial units of the foreign contracting parties did not also help from the point of view, of the return of the trainees to Algeria^[98] nor from the point of view of the conditions of the reinsertation of those trainees in the work which they have been trained for. Of course, trainees will continue to be sent abroad, but will have first to prove their capabilities during their initial training in Algeria.

The question of participation in the realization of industrial units which is neglected in all the previous contractual forms remains a very

critical element to any possible acquisition of technology, can also be accommodated in the plant in production method. It can be, for example, enlarged to include a dualistic structure for the construction of industrial units, in the same manner as in the initial management. However, this suggestion apart from being costly, may not be accepted by foreign firms, particularly when industrial secrets are involved. This is the case when the foreign partner insists on the insertion of a clause in the contract prohibiting the client enterprise from carrying-out maintenance or adjustment, or to have systematic recourse to the technology lessor's personnel. Thus, even if the foreign firms were to accept such obligations, the training would possibly be extremely limited to defined techniques, so that the trainees are taught purely and simply to perform the necessary functions and thus remain tied to the services of the foreign partner when faced with serious challenges (i.e. breakdown).

However, the question of participation in the construction stage may be more effective if the various tasks were to be contractually distributed among the partners[99]. The distribution of tasks may contain the following categories. First, a category of tasks reserved the NEs such as civil engineering, transport, organization of the plant, customs clearance of equipments and the training of junior staff and manpower. Certainly many enterprises will face difficulties in conducting these tasks, but temporarily they can call upon engineering services of other national enterprises, or foreign engineering firms, only when the former are not capable of conducting the assigned tasks. In this case, they can either call upon the services of the same partner, or preferably conclude a separate contract with another foreign engineering firm.

Second, a category of tasks reserved for the foreign partners, such as patents, licenses, know-how, technical assistance and the training of highly qualified personnel in their industrial factories.

The third category of tasks may be accorded to both partners and include the negotiation and the buying of equipment and machinery. The joint negotiations would allow NEs to know the technology market, as well as to gain negotiation experience. The presence of NEs at the same negotiation table may contribute to reducing the cost of equipments and eliminate abuses which may occur in their absence with regards to equipment's costs. The two partners, may also select jointly the trainees who require further training abroad.

The benefits of dividing the same contract between the two partners is that tasks can be moved from one category to another, depending on the capacity of the concerned NE in conducting these tasks. In this manner, NEs can acquire gradually all the necessary tasks for the realization of industrial projects.

Finally, taking into account the evolution of contracts for the realization of industrial projects, the high level of investment in a relatively short period, the lack of local technological capacity, and the option of high technology, one cannot fail to come to the conclusion that instead of developing the local technological capacity Algeria was rather buying development. As a result, instead of decreasing technological dependence the country became more dependent on the services of foreign firms, especially technical assistance intervention to run or to repair the industrial plants constructed unde turnkey

contracts. At the present and for some time to come turnkey contracts, realistically should not have a place in the industrialization of Algeria, except in small scale projects. Equally, in attempting to acquire foreign technologies Algeria seems to have taken the other way around. In other terms, it might have been better if it had started with the more packaged form of technology - plant in production - and not the opposite (see Annex 6:10).

The Algerian technological dependency is mainly on the capitalist countries since the most noticeable trend of Algeria's policy of diversification of the source of supplies^[100] is that such trend tends to stop at the frontiers of the capitalist countries. If we take the case of the light industries, for example, we will find that during the second Four Year Plan 1974-1977, the share of 11 firms from the socialist countries was no more than 362.27 million dinars or 1.58%, while the share of capitalist countries was 18657.64 million dinars or 81.52% of the total investment allocated for light industries and where the only sectors that the socialist countries have participated in were mining and steel^[102] (see Annex 6:11). This weak participation in the realization of Algeria's industrial projects is a result of Algeria's industrial policy on one hand, and on the other hand a direct result of the employed contractual forms.

First, the Algerian industrial policy, which as explained before is subjected to a considerable degree of gambling. In this sense the proposed technologies by the socialist countries generally remains not up to the standard which Algerian set-up for itself. This situation can be

explained by the fact that in many industrial branches, the socialist countries themselves, continue to rely on the technologies of the capitalist countries.

Second, the contractual forms. Enterprises from socialist countries appear to be always reticent and refuse to commit themselves to the forms of contracts which Algeria required at different stages, in particular turnkey and plant in production contracts. They prefer a simple market for the sale of their services (i.e. technical assistance, equipment) which have no global responsibility at the end of the works. This is possibly the main reason for the decrease of their participation since 1970, where 67% of signed contracts in the first 4 Year Plan 1970-73 were turnkey.

Apart from the above two reasons, financing contracts also plays an effective role in weakening the position of enterprises from the socialist countries. Algeria's position as an OPEC country and a very good future prospects as one of the main suppliers of natural gas, place it in a better position than many other developing countries. Despite this fact, public enterprises rely on foreign capital for about one fifth of their investment[103]. Thus external financing can be a deciding factor in contract's negotiations. Unlike the capitalist countries, socialist countries do not support a 100% finance by foreign currencies. In particular they do not support finance covering the indirect foreign exchange contained in local expenditure and down-payments. Once again, as in certain technologies, the socialist countries also call upon the international finance market to satisfy their own need in foreign exchange.

As to the participation of developing countries, it seems at the present time, that they have no role within Algeria's technological policy. Much of the previous reasons apply here as well.

The concentration by industrial branch and the concentration as a whole on the capitalist technologies leads to a concentration in the supply of technical assistance. This is partly because due to the fact that technical assistance is integrated in both turnkey and plant in production contracts[104]. Also partly because the technology suppliers may not allow the national enterprises to recourse to services other than the particular supplier.

Even in pure technical assistance contracts, 93% (in monetary values) was shared by capitalist countries, of which 63% was held by four countries: France, USA, West Germany and Italy, between 1973-1978. While the share of socialist countries was only 4%[105].

Since the geographical diversification of technology and technical assistance are almost concentrated within the capitalist countries, it may not be that important after all. On one hand, the production of technology in the industrialized countries leads to the domination of one or more firms of an industrial branch world-wide. Thus the recourse to certain technologies is limited from the beginning. On the other hand, multinationals and non-multinational firms from the capitalist countries often tend to cooperate among themselves through a tacit sharing of markets.

NOTES: CHAPTER FIVE

[1] G. D. DE BERNIS (1974) "Les Hydrocarbures gazeux et le developement des pays producteurs" Librairie technique, Paris p.379.

[2] For definition of technological capital see Chapter 4 note 27.

[3] For a list of the national enterprises under the responsibility of the three industrial ministries see Annex 5:1.

[4] Republique Algerienne Democratique et Populaire. Ministere de la Planification et de l'Amenagement du Territoire (1980)" SYNTHESE DU BILAN Economique et Social de la Decennie 1967-1978" ANEP ROUIBA MAI 1980, pp320-345.

[5] Ibid p326.

[6] The result of gignatism projects and enterprises led the Governemnt of Chadli Bendjedid to set-up a national Committee under the chairmanship of the Planning and Regional Development Ministry, Decree 80-242 of October 4, 1980. Among the principles adopted for the restructuring of national enterprises is the principle limiting their size to a maximum of about 30,000 employees. See Ministere de la Planification. Restructuration des Enterprises" November 1980 (a document prepared by the Committee).

[7] Each ministry has its own procurements office and it is responsible for meeting its own requirements under the allocated budget.

[8] Public Law No. 78-02 of February 11, 1978, concerning state monopoly of external trade (import and export). Journal Officiel de la Republique Algerienne (J.O.R.A.) no. 7 (1978) pp171-175 Article 1.

[9] Ibid, Article 3.

[10] Ibid, Article 18 of the 1978 Public Law. See also credit LYONNAIS International (1982) "La Reglementation Algerienne relative aux importation" Novembre 1982.

[11] Ibid Article 22(a) Another exception to state monopoly concerns import permits which can be granted by the state to Algerian private companies for the importation of products if those products are not under the monopoly of any of the state agencies and only when those products concern production. In any case, no import permits shall be granted for importation of goods and their resale without any modification. Article 22(b).

[12] Ibid Article 2.

[13] Ibid Article 9.

[14] Those practices concern agents, mostly Algerians who set-up engineering consultant companies abroad and who used to work or have strong ties with public enterprises in Algeria in particular SONATRACH and later became agents for National enterprise; for example, the ex-vice chairman of SONATRACH Ait LABUSSINE who was accused of setting up a group

of experts in association with a responsible from the American company EL-PASO, which had at that time a big contract for the supply of Algerian LNG. However, Ait Laoussine denies any association and claims that he only has his own consultant firm in Geneva. One can only ask from where he obtained the financial resources to set-up a consultant firm in Geneva. It is not difficult to see the connection between his last job in SONATRACH and his present situation. See Le Monde 10 Fevrier 1982 p5 and 7-8 Mars 1982 p4.

[15] All bids are governed by "Code des Marches Publics Ordinance" no. 65-182 of July 10, 1965.

[16] See Chapter 6 which follows.

[17] F.O.B. "Free on board" and C.I.F. "Cost, insurance and freight" costs are reimbursable.

[18] The non-existence of inflation clause, price escalation, training and commodities prices makes the plant in production contracts by far the most costly form.

[19] Equipment brought into Algeria by foreign firms for training purposes cannot be re-exported.

[20] The Algerian obligations Law, provide under Article 18 of the "Code Civil" that contracts are governed by the Law of the place where it is signed unless the parties agreed otherwise. The table below shows the recourse to the national law and arbitration in 17 contracts:

APPLICATION LAW	JURISDICTION	TRIBUNAL LOCATION
ALGERIAN LAW 11	International Chamber of Commerce	GENEVA 4
ENGLISH LAW 1	Arbitration 10	ALGIERS 2
SWISS LAW 1	Ad-hoc Arbitration 2	ZURICH 2
Custom & General principles 1	Algerian Jurisdiction 3	LAUZANE 1
	English High Court 1	ROME 1

Source: M. ISSAD (1976) "Les Techniques Juridiques dans les Accords de developpement Economique" in Droit International et Development: Collected Papers of an international Seminar held in Algiers 11-14 October 1976. Published by the Office Des Publication Universitaires, HYDRA, ALGER.

[21] Although states in the industrialized countries protect and safeguard their companies rights from other states, abuse of dominant position is exercised in some sectors such as aviation and electronics. This domination is equal to that exercised over companies from the developing countries. The cause is the same: too wide technological gap.

[22] See Kamel Bouguerra, Hubert Michel (1976) "Essai de developpement par consomanation massive de technologies: Le cas de l'Algerie" Annuaire de l'Afrique du Nord. Vol. 15 ppl23-134.

[23] The investment share of the iron and steel branch in the 3 plans period 1967-1977 was as follows:

PLAN	ACTUAL INVESTMENT (A)	PERCENTAGE (1)	PERCENTAGE (2)
3 Years Plan (1967-69)	935.0	19.0	39.1
1st 4-Year Plan (1970-73)	2885.8	13.9	26.2
2nd 4-Year Plan (1974-77)	7416.7	10.0	19.4

(A) in million of DA.

(1) percentage according to the total industrial investment.

(2) percentage according to the total excluding hydrocarbon sector.

[24] The idea to establish a steel complex in the region of Annaba goes back to 1957. In fact, in this same year the SERISAL: Societe d'Etude pour la Realization d'Installations Siderurgique en Algerie was created at the initiative of French steel companies including Usinor, De Wendel, Lorraine-Escout. See A. GUESMI (1967) "Un complex siderurgique a El-Hadjar (Annaba)", memoire de these, Ecole Superieure de Commerce Universite d'Alger ppl-11. The chief instrument in heavy industry, the SNS, was set-up on September 3, 1964. In 1964 the Societe Francaise d'Etudes d'Installations Siderurgiques SOfRESID was granted the contract for The civil engineering for the blast furnace plant.

[25] The total amount of investment in El-Hadjar iron and steel complex from 1964-1975 was 4702 million Algerian Dinars compared to 2048 million dinars in other steel plants. However, this cost of contracts is by no means the actual cost since it only represents the cost at that time when contracts were signed, and since it does not include technical assistance cost and other services.

[26] The choice made by the Algerian authorities was for the rolling of

flat products, thus meeting the basic needs of the national economy and initiating a whole series of processing industries. The 650 m³ blast furnace can produce 1200 tons of cast iron per day for supplying the steel-works. The hot rolling mill can produce either heavy gauge sheet or steel coil. The cold rolling mill is essential for mass consumption steel. (See table 5:3 contracts 1,2,5,6,8 and 9).

[27] In 1969, the largest plant in the world for producing helically and electrically welded spiral pipes from steel coil with a capacity of 100 000 tons per year of large diameter pipes (up to 1.20 m) became operational, (Contract no. 7 Annex 5:3). These pipes are mainly used for hydrocarbon pipelines and water mains. The quality of the pipes was soon demonstrated as being the only one which stood to the rigorous start-up test without failure from all the pipes of the Hassi Messoud-Skikda oil pipeline. At the same time SNS has built a plant for the production of seamless pipe, and a wire and rod mill plant. The first is essential in the fields of petroleum, surveying, mining and hydraulic engineering whilst wire and rod are required in the building and civil engineering industries [contracts 12, 13 and 11 respectively Annex 5:3].

[28] In 1971, the SNS decided to increase production capacity to 2 million tons by 1977 involving a capital investment of 1500 million dinars (contract 11).

[29] President Houari Boumediene May 1, 1974.

[30] Government of Algeria. ministere de la Planification et de l'Amenagement du Territoire (1980) "PROJET DE PLAN QUINQUENNAL 1980-84" MAI (1980) pp423-42.

[31] More than 20 foreign firms were contracted to either supply equipments, or to erect plants, or for civil engineering work or feasibility studies or to provide technical assistance representing 8 capitalist countries (France, Italy, UK, Japan, Belgium, Austria, Sweden and West Germany) and only two socialist countries, USSR and East Germany (see table 5:3) for details.

[32] In certain turnkey contracts, if the concerned national enterprise is capable of doing part of the work or providing the services, that particular work of service is excluded from the turnkey contract; for example, the 1975 contract between SONATRACH and the French firm CREUSOT-LOIRE ENTREPRISE for the construction of Annaba's ammonia complex at a cost of 401 million DA which exclude general services (civil engineering) also the cement works of Constantine and Beni-Saf awarded to the same French firm at the cost of 450 m DA each and both excluded civil engineering.

[33] For further details see L. Talha and others (1976) "Les strategies du matiers premieres au Maghreb" CNRS, Paris ppl48-151, Kamel Bouguerra et Hubert Michel (1976) op cit. ppl29-130.

[34] DERSA (1981) "L'Algerie en Debat: L'utle et Developpement" Francois Maspro, Paris p96.

[35] Petrochemical plants are concentrated in three Industrial pools:

(1) Arzew's complex which comprises two ammonia and ammonium nitrate plants for the manufacture of nitrogen fertilizers, a methanol plant and resins plant;

(2) Annaba's complex which focusses on fertilizers, comprises an ammonia and ammonium nitrate plants - a duplication of ARZEW's second plant and a phosphate complex; and

(3) The Skikda complex consists of a plant producing 120,000 tons a year of ethylene and another plant producing 35,000 tons a year of polyvinyl chloride (PCV).

See Ministere de l'Information et de la culture: Visage de l'Algerie "Les Hydrocarbures" No. 15, pp72-74, for the list of contracts see Annex 5:4.

[36] See Skikda in Annex 5:4.

[37] World Bank (1982) "Algeria, the Five Year Development Plan and the Medium term prospects for 1980-1984" Vol. 2 June 25, p106.

[38] P. JUDET; J. PERRIN (1971) "A propos du transfert des technologies pour un programme integre de developpement industriel" Institut de Recherche Economique et de Planification, GRENOBLE Juin p24.

[39] A turnkey contract is considered to be judicially fulfilled as soon as the start-up operation is successfully conducted.

[40] See Annex 5:6.

[41] For training see "plant in production" contract.

[42] Republique Algerienne Democratique et Populaire: Ministere de la Planification et de l'Amenagement d'uterritoire (1980) "SUNTHESE DU BILAN ECONOMIQUE ET SOCIAL DE LA DECENNIE 1967-1978" Mar p311.

[43] Although no figure can be advanced for cases where final acceptance were signed without any test at all, I was told by an Algerian official that these are by no means rare.

[44] "Produit en main" can either be called "Plant in production" or "run-in" or "product at hand" contracts.

[45] By way of example, the foreign contracting party is not absolved from responsibility after the test of the quantitative parameters, but after the national enterprises check and make observations of such terms and references which they consider of special importance, such as the overall functioning of industrial complex - not of subunits as in turnkey - or after the installations have been working for a fixed period of time under the NEs and local personnel whom the supplier is partially responsible for training-not after start-up tests-. In other words, the responsibility of foreign contracting parties under the "plant in production" method is not limited to the stage of realization or to the mere physical delivery of industrial plants.

[46] The penalty system also applies in cases where there are dealys in the setting up of the industrial units, malpractices, the falling of production short of the indexed quality and quantity. In such cases the payment would be less than the agreed amount scheduled for such a period.

[47] In the Franco-Arab seminar in Paris Juin 16, 1975, organized by the Franco-Arab seminar chamber of commerce, the delegates of construction firms were either very reserved or frankly very hostile to the method "plant in production" Le Monde 11 Ocxtobre 1975 p30.

[48] DIMITRI GERMIDIS (1976) "Le Maghreb, la France et l'enjeu technologique" Editions Cujas p77, also see "les societes de service: un an apres le choc: Etude realisee par le Ministere de l'Industrie et de la Recherche (France)" Entreprise no. 1019, 21 Mars 1975; G. LAUZUN "Contract produit en mains attention, casse-coul" Les Informations no. 1558, 24 Mars 1975.

[49] At the end of 1974, the ex-Algerian Minister for industry and energy declared: "Nous avons les impression que certains industriels Francais ne croit pas a nos projets ambilieux. Ce scepticisme conduit a la temporisation. Beaucoup de projets ont ainsi ete manques, par les industriels Francais. Par exemple, it ne vou lairent pas croire a notre usine d'engrais. Nous l'avons faite Nous-memes. meme chose pour le complex petrochimique de Skikda; meme chose pour le l'usine de tracteurs de Constantine, Berliet a rattiape le train..." Les Informations no. 1539-1540 du 23 Novembre 1974.

[50] Republique Algerienne Democratique et Populaire; Ministere des Industries legres (1979) "Rapport Sur les problemes financieres de l'industrie socialiste" Volume 2 "Inflation et Financement du developpement" Premiere Partie: "les facteurs d'inflation en Algeir", November 1979.

[51] The contract was signed in 1969 as a turnkey contract between SONACOME and DIAG and later in 1974, it was converted to a plant in production contract, at a cost of 535 million dinars.

[52] The penetration of the Algerian mechanical industry by the West German firm DIAG can be seen in terms of contracts awarded to foreign firms by SONACOME. Out of 11 contracts signed between 1969-1977 in this sector, DIAG was awarded 4 contracts while other firms were awarded no more than one contract. See Annex 5:5.

[53] The collaboration of the West German firms led by DIAG can also be seen in terms of the importance of the contracted industrial complexes. The Constantine's Engine and Tractors complex has an annual capacity of 5,000 tractors, but in reality such a capacity was never reached. During my visit to the plant in the summer of 1981, I was told that the main causes for the low level of production were: (i) the high level of integration 70% which was consequently reached in 1979; (ii) the large scale of the project, (iii) the required high level of skilled manpower and (iv) technical problems concerning the second model of tractors, which was found not to be suitable for the Algerian soil.

[54] The cost of such management, though included in the contracts price remains a source of discomfort and dissatisfaction within the NE personnel.

[55] The major national training institutions are:-

(A) HYDROCARBON SECTOR:

L'Institut National des Hydrocarbures et de la Chemie (INHC) (National Hydrocarbon and Chemical Institute) created in coopertion with the higher education institutions of USSR.

L'Institut Algerien du Petrol, dus Gaz, des Matiere Plastiques, et des Moteurs (IAP) (Algerian Institut for Petroleum, Gaz, Plastic Chemicals and Engines) created in cooperation with IPF of France.

(B) Heavy Industry:

L'Institut National pour les Mines, la Metallurgie, les Materiaux de construction Mecanique (IMA) National Institut for Mining, Metallurgy, Building Materials and Mechanical Engineering, established in cooperation with USSR.

(C) Light Industry:

L'Institut National des Industries logeres (INIL) National Light Industries Institute, maintains exchange relations with France, USA and USSR.

(D) Industrial Development:

L'Institut National de la Productivite et du Developpement Industriel (INEPD) National Institute for Productivity and Industrial Dewvelopment, for advanced and industrial management training, and technical-economic studies.

(E) Institut du Genie Mecanique (IGM) Mechanical Engineering Institute, set up in collaboration with France.

(F) Institut pour l'Electricite et l'Electronique (IEE) Institute for Electricity and Electronic, build with the collaboration of USA inside the SONELEC complex at Tlemcen.

Apart from the above mentioned institutes, 33 technological and education institutes were planned for the period 1967-1978, bnut only 12 of these were in fact realized. See Republic Algerienne (1980) SYNTHESE DU BILLAN, op cit. pl63.

[56] See Chapter 6; and also see Mohamed Salem (1978) "Assistance Technique Industrielle: Modeles et Regimes Juridiques" in "Droit International et Developpement" published by the Organisme National de la Recherche Scientifique et Institut de Droit de l'Universite D'Alger: OPU 1978, op 249-266.

[57] The duration of training in the centre differ according to the category:

3-6 months for specialized workers;

6-12 months for professional manpower; and

about 2 years for supervisors.

[58] The duration of training abroad is often 3 years.

[59] For further details on the question of training see; Ministere de la Planification (1979) Annuaire Statistique de l'Algerie op cit ppl84-190; SYNTHESE DUBILAN (1980) op cit ppl58-175 PROJET DE PLAN QUINQUENNAL 1980-84 op cit 157-158. World Bank (1982) op cit pp51-57, and table 11:2 p244; table 11:3, p245 for cost of training.

[60] The 96 million dinars constitute the 10% of 960 million dinars cost of the project see table 5:2 (1).

[61] HELGE HUEEM (1978) op cit pl0.

[62] A simple calculation shows that while Algeria represented 0.5% of the third world population in 1973, it consumed about 15% of the volume

of technology exported by the industrialized countries. In other terms, Algeria imported by inhabitant about 25 times more technology than in the other countries of the third world. See DARSA (1981) "L'Algerie en debate: lutttes and developpement" FRANCOIS MASPRO p98; DEMITRI GERMIDIS (1976) op cit p66.

[63] Ministere de la Planification (1980) "SYNTHESE DU BILLAN" op cit p308.

[64] Ministere de l'Industrie et de l'Energie "Couts et Surcouts de l'Industrialization" Alger p4 (non-dated document).

[65] A survey of ACTIM, as cited by DERSA (1981) "L'Algerie en Debat" op cit. p99.

[66] Engineering or "Bureaux d'Etudes" is a strategic industrial activity. Except for separate contracts, it is solely reserved for foreign partners of NES in turnkey contracts up to the start-up tests, and to the final delivery in plant in proudction contracts. The influence of foreign partners through technical assistance is also felt heavily when plants are delivered to NES due to the shortage of highly qualified personnel in this field. Engineering consists of five different phases:-

(1) PRELIMINARY STUDIES: Concerns the choice of products, methods of production and the size of investment. These studies include market surveys, comparison between different production methods and their effect on the need.

(2) FEASIBILITY STUDIES: its aim is to determine precisely: production and products capacities; production processes; equipment and machinery investment; localization, size and employment. It requires a personnel with a well developed knowledge about existing machinery, potential suppliers and production methods.

(3) SPECIFICATIONS: It is the phase where the selected alternatives are examined to determine what is needed to carry them out. To provide the basis for the bids that foreign firms or national enterprises will make. It is by far the most difficult phase, and requires very detailed technical knowledge about the existing alternatives and their eventual possibilities.

(4) ORGANISATION AND CONTROL: This phase relates to the control of the time plan, construction and cost. It takes place during the construction process.

(5) EVALUATION: It begins when industrial units are realized and in operation. Its main function is to correct mistakes, to analyze and evaluate experiences, and to examine the possibilities for extension. More important, it is the phase where experiences can be accumulated to be used in other projects.

[67] Although engineering departments were created and developed with many national enterprises (i.e. SNS, SNMETAL, SONALGAZ and SONATRACH), it was quite impossible to provide each NES with its engineering department. The tasks of following industrial projects were given to the Societe Nationale D'ETUDE ET REALISATION INDUSTRIELLES "SNERI".

[68] The 1980-84 Plan calls for the creation of autonomous engineering departments within each industry rather than to have engineering tied to the structure of production enterprises. See Ministere de la Planification (1980) "PROJET DE PLAN" op cit. p379. Many of these autonomous engineering departments have already been established as a result of the Comite National pour la Restructuration des Entreprises set up by Decree 80-242 October 4, 1980, which is chaired by the Minister of Planning and drawn-up from 11 Ministries: Examples for this would be;

- The Energy and Petrochemical Industry (e.g. SONATRACH), which now has its own Enterprise National d'Engineering, created in 1982 at Skikda.

- S.N.E.R.I. was divided into 5 national enterprises in 1981:

- (1) National Enterprise for Engineering (At ALGIERS)

- (2) National Enterprise for technical installations (at BLIDA)

- (3) Three Regional Enterprises for Realization: Centre (ALGIERS), East (ANNABA); and West (ORAN).

- S.N.S: Three regional Engineering departments to be set up at ALGIERS (1983), ORAN (1984), and JIJEL (1984).

For further details and list of all the new engineering enterprises and departments (established or to be established), consult Ministere de la Planification: Comite National Pour la Restructuration des Entreprises (1982) "Localisations des Sieges des Nouvelle Enterprises" Mars (1982).

[69] The cost of the imported spare parts is quite considerable within the Algerian industries. It amounted to 5832.5 million dinars between 1967 and 1978 excluding spare parts for transport and representing an average annual growth rate of 24.

1967		1970		1974		1978		Average Annual Growth Rate
<u>imports(i) index</u>		<u>imports index</u>		<u>imports index</u>		<u>imports index</u>		<u>1967-1978</u>
331.3	100	873.0	294	1347.3	407	3280.9	991	24

(i) imports in Million Algerian Dinars.

Source: World Bank (1982) op cit p260 table 12:12.

[70] Paul Balta et Claudine Rulleau (1978) "La Strategie de Boumediere" La Bibliotheque Arabe Sindbad, PARIS ppl60-161.

[71] See Annex 5:4 and note 35 above.

[72] Other firms, in particular Americans, advanced identical proposals. Six foreign firms responded to the 1965 tender; 3 Americans and 3 Europeans. See El-Moudjahid of 30.9.1967.

[73] The signal to start work was given by the Presiden Boumediene on September 28, 1967. See EL-MOUDJAHID 28.9.1967.

[74] For a background and the negotiation of the Gas agreement between Algeria and France, see SONATRACH (1972) "La Politque petroliere de l'Algerie: Events, Etudes, Declarations" Tome 1 1965-1967 ppl86-198, and El-Moudjahid of 3.6.1967.

[75] See El-Moudjahid of 17.10.1967.

[76] According to the Bulletin Industrial de Petrole no. 1139 of July 30, 1968 the demand for ethylene and products derived from it did not seem to be weak.

[77] Le Monde 30.9.1968.

[78] The realization of the project was awarded to the French companies, TECHNIP and ENSA. The work-yard started on September 29, 1967. The site of Arzew was chosen for the simple reason that there was an LNG plant functioning already (CAMEL) and a gas pipeline was also running. The project employed 2500 workers for the construction phase, and currently employs 360 production personnel. The training of manpower was also granted to Technip, which was required to train 300 nationals of which: 35 were engineers, 35 supervisory staff and 230 qualified and specialized manpower. See El-Moudjabid of 28.7.1966; 19.10.1966, 15.9.1967; 28.9.1967 and 30.9.1967. Le Monde 29.7.1966, 16.9.1967.

[79] Democratic And Popular Republic of Algeria (1974) "Petroleum, Raw Materials and Development: Memorandum submitted by Algeria on the occasion of the special session of the United Nations General Assembly April 1974" published by SONATRACH para 58 p40.

[80] Le Ministre de l'Industrie et de l'Energie, Le Monde 15.4.1968.

[81] Le Ministre de Finances: EL-MOUDJAHID 11 Octobre 1969.

[82] See TERESA HAYTER "Bank's red Button-Hole" The Guardian Friday 11.11.1982.

[83] Sid-Ahmed Gosali, Le Monde 20 Juin 1970, M. MEKIDECHE (1980) "Le Secteur des Hydrocarbures: Quelle Contribution Au DEVELOPPEMENT ECONOMIQUE ET SOCIAL DE L'ALGERIE?" Revue TIERS-MONDE no. 83 (Speciale Algerie) VOL XXI p520.

[84] "Le capital prive etranger, auquel vent nous acculer la Banque Mondiale, se presente comme un agent zele de la politique neo-colonialiste, qui consist pratiquement a vous retirer d'une main plus qu'elle ne vous a donne de l'autre" El-Moudjahid 5.9.1967.

[85] It is estimated that by the setting up of ammonia plant Algeria had in fact saved up to 150 million dinars which would otherwise be marked for fertilizers imports. El-Moudjahid 28.9.1967.

[86] Among the international financial institution who lent money to Algeria we find IBRD which changed its policy after the arrival of McNamara as Chairman: For example, three loans of a total of 157 million dollars in July 1974: (1) A \$70 m to help finance construction of a new \$293 m port at Bothiona for the export of LNG; (2) A \$49 m to assist in financing a \$127.3 m railway rehabilitation and modernization, and (3) A \$38.5 m to help finance a power project involving the installation of three 40,000 KW gas turbine. The US Export-Import Bank (Eximbank) has also been a prominent lender to Algeria. Its two biggest loans have been \$240 million to Sonatrach for Arzew's second liquifaction plant LNG2 in 1978. For further details on loans to Algeria (Bilateral and multilateral) see; LLOYDS BANK LIMITED: Overseas Department Export promotion, International Aid Bulletin from 1970-1981; The World Bank

(1982) op cit., table 4:1, 4:2, pp189-191; MIDDLE EAST ECONOMIC DIGEST (1978) [Special Feature Algeria] November 24, pp11-12; TAHAR BENHOURIA (1980) "L'Economie de l'Algerie" Francois Maspro, PARIS for a detailed list of loans from France, Italy, West Germany, Japan, US, UK and their banks: pp 307-310. US Department of Commerce, Industry and Trade Administration, Foreign Economic Trends and their implications for the US: Algeria (Washington D.C. 1979) p2; Nicole Grimaud (1973) "les finance publique en Algerie" Maghreb-Macherek no. 65 p31.

[87] The Algerian public enterprises rely on foreign financing for about one fourth and the rest is supplied from domestic savings. Between the two, they are industrializing Algeria. The investment of the state enterprises between 1975-1980 was as follows:- (in million of dinars)

	1975	1976	1977	1978	1979	1980
Total investment of						
public Enterprises	16,739	23,652	31,757	40,519	40,178	38,135
Long-term loans	8,251	11,981	18,095	23,886	24,455	25,554
Short-term loans	2,846	3,811	4,535	2,418	1,171	1,352
External Financing	5,642	7,861	9,127	14,215	14,552	11,229

SOURCE: Ministere de Finance

Ministere de la Planification (1980) "SYNTHESE DU BILAN" op cit.

for the period 1967-1978 Annexes IV:12, IV:13 pp274-275.

The most important Algerian borrower is SONATRACH, which needs enormous amounts of capital to finance the construction of refineries, pipelines and liquid natural gas plant. For example, 34133 millions of dinars was borrowed by SONATRACH during the period 1975-1980 or more than the half.

[88] See Annex 6:7 for SONATRACH'S subsidiaries.

[89] Ordonance no 71-22 du Avril 1971 Diffinissant le Cadre dans lequel s'exerce l'activite de societes etrangeras dans le domaine de la Recherche et de l'exploitation des hydrocarbures lequides Articel 3, Journal Officiel du 13 Avril 1971 p366.

[90] Ordonance no 66-284 du 15 September 1966 portant Code des Investissements. Journal Official du 17 Sep 1966 p901. IIM vol(6) 1967 pp92-99.

[91] Ibid, Art.4.

[92] For further details on the Investment Code and the fundamental law for Hydrocarbons see, Nour-Eddine TERKI (1976) "Les Societes Etrangeres en Algeries" OFFICE DES PUBLICATIONS UNIVERSITAIRES ppl48-187.

[93] For example in The Steel Industry there are four mixte enterprises Genisider, Sidal, Realsider, Casider. See also note 88 above.

[94] The machine-tools complex at Constantine was for example realized by Almo which is a subsidiary of Sonacome 75% and Warner 25% (a subsidiary of DIAG). See also Kamel Bouguerra, Hibert Michel (1976) "Essai de developpement par consomation massive de Technologie" Annuaire De L'Afrique du Nord Vol 15.

[95] See Chapter 4 above.

[96] Ministere de la Planification (1980) "SYNTHESE DU BILAN" op. cit p327.

[97] Democratic and Popular Republic of Algeria (1975) "Memorandum submitted by Algeria to the conference of Sovereigns and Heads of States of OPEC Member Countries": Annex IX The Acquisition of under-developed countries of the Technology needed for their development" MARCH 1975.

[98] According to the Planning Ministry a substantial number of those trainees, often remain in the countries where they have been trained after their period of training comes to an end, representing a quite significant loss of trained manpower, see Ministere de la Planification "SYNTHESE DU BILAN" op cit p327.

[99] The Ministry of Planning, in analyzing the period 1967-1978, concluded that a portion of the construction work must be conducted under an Algerian team responsibility. See "Bilan de Synthese" (1980) op cit. p327.

[100] A major element of the development process of Algeria's industrial sector is carried out on the basis of diversification of technology supplies (See Annex 6:3 for example). Such diversification, as Helge Hveem put it "was literally speaking oiled by the conflict with France during the 60's and early 70's". Helge Hveem (1978) op cit, p9. The examination of contracts concluded between 1967-1977 shows that the decrease of France's share of contracts from 60% in 1962-1966 to 33% in 1974 (in monetary value terms) has been mainly to the benefit of other capitalist countries from Western Europe and North America. It also shows that despite the geographical diversification of technology supplies, such diversification appears only at the national level, but not at the level of industrial sectors; examples:

- French companies dominate the branches of petrochemicals, textiles, wood, and to less extent the construction materials industries.
 - West German firms have established a strong position in the mechanical and electrical engineering industries.
 - American firms occupy a dominating position in the gas liquefaction, wood, and electrical industries.
- (See Annexes 6:3, 6:4, 6:5, 6:7 and 6:11).

[101] See Annex 6:12 for detailed investment in the light industries during the second 4 Year Plan 1974-1977.

[102] In the mining sector the participation of socialist countries was evident up to 1968 with 5 contracts amounting to about 400 million dinars. As far the steel industry is concerned see Annex 6:3, plus the M'sila Aluminium plant which cost 1500 million dinars.

[103] See note 87 above.

[104] See Annex 6:6 - Technical assistance as part of the transfer.

[105] The cost of technical assistance between 1973-1978 (excluding integrated assistance) amounted to 28600 million dinars shared by France 20%, USA 17.6%, West Germany 13.9%, Italy 11.7%, Japan, Canada, Belgium, UK, Switzerland, Netherland and Spain shared 30%, socialist countries 4%, and developing countries 3%. Ministere de la Planification (1980) "SYNTHESE DU BILAN" op. cit. pp307-309.

ANNEX 5:1

National Enterprises Under Three Ministries for Industries (1)

Ministry of Energy and Hydrocarbon Industries	MINISTRY OF HEAVY INDUSTRY	MINISTRY OF LIGHT INDUSTRY
- SONATRACH and its subsidiaries (HYDROCARBONS)	- SONAREM (ALREM) MINING	- SOGEDIA: sugar, fats and oils fruit juice
- SONALGAZ (Electricity & Gas)	- SNS (GENISIDER, SIDAL REALSIDER, COSIDER) IRON AND STEEL - SNMETAL, SONACOME (ALMO) Mechanical Eng. - SONELEC: Electrical and electronical engineering	- SNEMA: mineral water - SNEPAC: cereals processing - SNTA: Tobacco & matches - SONITEX: Textiles - SDNIPEC: Shoe Factories - SNIC: Light Chemical industries - SNLB: Wood - SNAT: Hand crafts - SNMC: construction materials - SNERI

(1) This division continues to exist, but all the enterprises have been broken-up under the restructuring operation which started in 1980. For example SONATRACH was divided into 13 specialized enterprises.

(2) For a complete list of Sonatrach subsidiaries and associated companies see Annex 5:7.

(3) The companies in parentheses are mixed enterprises.

ANNEX 5:2

THE IMPORT MONOPOLY ENTERPRISES IN THE
INDUSTRIAL SECTOR IN ALGERIA

ENTERPRISE	FIELD OF MONOPOLY
SONATRACH: Societe Nationale de Transport et de Commercialisation des Hydrocarbures.	Responsible for exploitation, research, production, refining and marketing of oil and gas. Import monopoly for certain chemicals, petrochemicals, petroleum derivatives and petroleum exploitation equipments.
SNS: Societe Nationale de Siderurgie	Import monopoly on iron and steel products.
SONACOME: Societe Nationale Algerienne de Construction Mechaniques	Monopoly on imports of all sorts of mechanical equipments including cars, trucks, industrial vehicles and spare parts, machines, tools agricultural machinery and pumps.
SONELEC: Societe Nationale de Fabrication et Montage du Material Electrique et Electionique	Monopoly on imports of electronic equipment, electrical wire and cables, generators, spark plugs, communication equipment, microphones, radio-telephones, transmitters and receivers.
SNMC: Societe Nationale des Materieux de construction	Monopoly on the production of construction materials, and the importation of building materials of zinc, wire gauze, cement, bricks.
SNIC: Societe Nationales des Industries Chimique	Monopoly on the imports and the production of chemical products.
SNCOTEC: Societe Nationale de Commercialisation des Textiles	Monopoly import on cotton thread yarn textile, shoes, skins and leather.
SNIA: Societe Nationale des tabacs et des Allumettes	Monopoly on imports & manufacture of tobacco products and matches.

SOURCE: Collected from different sources in particular custom services.

ANNEX 5:3

DIFFERENT SEPARATE CONTRACTS(1) PASSED BETWEEN THE SNS AND FOREIGN FIRMS FOR THE

REALIZATION OF EL-HADJAR STEEL AND IRON COMPLEX

YEAR	TYPE OF CONTRACT	SUBJECT OF CONTRACT	CAPACITY (in Tons)	Cost in millions of dinars	
				FOREIGN PARTNERS	COUNTRY COST
1964	1. ENGINEERING CONTRACT	* General Engineering (Ingenlerie d'ensemble)		SOFRESID	FRANCE 94
	2. Realization Contract	* Blast Furnace Plant	400 000	SIDL & CAFL	FRANCE 312
	3. ENGINEERING CONTRACT	* OXYGEN STEEL MAKING PLANT	400 000	LENGIPROMEZ	SWEDEN } 633
	4. EQUIPMENTS SUPPLY CONTRACT	- ENGINEERING - EQUIPMENT SUPPLY		TIAJAPROMEXPORT	USSR }
1965	5. ENGINEERING CONTRACT	* HOT ROLLING MILL	600 000	SOFRESID	FRANCE } 89
	6. SUPPLY & ERECTION CONTRACT	- ENGINEERING - SUPPLY OF EQUIPMENT		INNOCENT & MARELLI	ITALY }
1967	7. SUPPLY AND PLANT ERECTION CONTRACT	* WELDED SPIRAL PIPE PLANT	100 000	HOESCH	W. GERMANY 44
1968	8. ENGINEERING CONTRACT	* COLD ROLLING MILL	150 000	DAVY & UNITED	U.K. 17
	9. SUPPLY OF EQUIPMENT CONTRACT	- ENGINEERING - EQUIPMENT		VDEST DEMAG STEINROUBAIX	AUSTRIA } W. GERMANY } 196 BELGIUM }
1969	10. SUPPLY & PLANT ERECTION CONTRACT	* GALVANISATION & TINNING PLANT		WEAN	U.K. 50
1971	11. TURNKEY CONTRACT	* EXTENSION OF EL-HAJAR + SECOND BLAST FURNACE PLANT + WIRE & ROD MILL + COOKING PLANT + THIRD CONVERTER	2000 000	TIAJAPROMEXPORT	USSR 1500

12. ENGINEERING CONTRACT	* SEAMLESS PIPE PLANT				
13. SUPPLY & PLANT ERECTION CONTRACT	- ENGINEERING - EQUIPMENTS	80 000	SOFRESID INNOCENT & MARELLI	FRANCE ITALY	37 446
14. ENGINEERING CONTRACT	* Electrical Steel Work	120 000			
15. SUPPLY OF EQUIPMENT CONTRACTS	- ENGINEERING - EQUIPMENT		SOFRESID ASEA KUTTNER CLARK CHAPMAN LLIMEX	FRANCE SWEDEN W. GERMANY U.K. E. GERMANY	} 142
1973 16. ENGINEERING CONTRACT	* THIRD PHASE OF EL-HADJAR		ATKINS	U.K.	169
1975 17. TURNKEY CONTRACT	* EL-HADJAR'S COKEWORK	n.a.	COPPERS - FRANCE (subsidiary KRUPP)	FRANCE	152
1975 18. TECHNICAL ASSISTANCE CONTRACT	* AGREEMENT ON THE CO- OPERATION IN THE FIELD OF COKEWORKS PROJECTS		RUHRKOHLE AND ITS SUBSIDIARY MONTAN CONSULTING	W. GERMANY	n.a.
1975 19. SUPPLY OF EQUIPMENT AND ERECTION CONTRACT	* EXTENSION OF ROLLING MILLS		INTERNATIONAL CONSORTIUM OF 11 FIRMS INCLUDING C. ITTOH & IJACH (JAPAN) 40Y. LED BY DEMAG IN GERMANY.		821

(1) Excluding CONTRACTS 11 and 17.

n.a. not available

SOURCE: Ministry of Industry and Energy (1974) "The Industrial Revolution" published on the occasion of the 20th Anniversary of the Launching of the 1954 Revolution pp73-79.

- Annuaire de L'AFRIQUE DU NORD (Different Volumes)

- PIERRE CHAULEUR (1979) "L'Afrique Industrielle" G.P. Maisonneure et Larose, France.

- F. YACHIR (1980) "Les flux d'importation de technologie dans le secteur public en Algerie" Ruvue Algerienne des Sciences Juridique Economique et politique Vol. XVI No. 4 December pp685-7.

- Other sources include "INDUSTRIES ET TRAVAUX D'OUTRE-MER"

"MARCHES TROPIC AUX ET MEDITERRANEENS"

"EL-MOUDJAHID.

ANNEX 5:4

TURNKEY CONTRACTS IN THE ALGERIAN PETROCHEMICAL INDUSTRY
(in million DA)

INDUSTRIAL ZONE	YEAR OF CONTRACT	TYPE OF CONTRACT	SUBJECT - MATTER OF THE CONTRACT	FOREIGN PARTNER	COST
	1967	TURNKEY	AMMONIA & AMMONIUM NITRATE PLANT	TECHNIP (F) } ENSA (F)	267
	1967	TURNKEY	METHONOL PLANT	HUMPHREY AND GLASGOW UK	36
	1967	TURNKEY	RESINS PLANT	ITALCONSULT (I)	17
	1974	TURNKEY	AMMONIA PLANT	CREUSOT-LOIRE (F)	321
	1974	TURNKEY	NITRATE FERTILIZERS PLANT	KREBS (F)	116
	1969	TURNKEY	PHOSPHATE FERTI-LIZERS PLANT	KREBS (F)	214
	1974	TURNKEY	NITRATE FERTILIZERS PLANT	VOEST-ALPINE AUSTRIA	116
	1975	TURNKEY ¹	AMMONIA COMPLEX	CREUSOT-LOIRE (F)	401
	1975	TURNKEY	ETHYLENE PLANT PVC PLANT	TOKYO-ENGINEERING CORPORATION & ITOH (JAPAN)	} 410

1. Excluding general services. Source F.YACHIR (1980) op. cit pp683-4.

ANNEX 5:5 CONTRACTS AWARDED TO DIAG IN THE MECHANICAL INDUSTRY

(in million DA)				
YEAR	TYPE OF CONTRACT	SUBJECT MATTER	SONACOME'S PARTNER	COST
1969	TURNKEY converted into plant in production	Engine & Motors Complex at Constantine	DIAG and KLOCKNER Humboldt-DEUTZ	552
1970	TURNKEY	CYCLE & MOTORCYCLES Complex at Guelma	DIAG, FICHTEL SACHSZWEIRADUNION	89
1973	PLANT IN PRODUCTION	Agriculture Machinery Complex at Bel-ABBES	DIAG AND KALAS	
1973	MIXTE ENTERPRISE	Machine Tools Complex at Constantine	ALMO ⁽¹⁾	129

(1) A subsidiary of SONACOME 75% and FRITZ WARNER 25% which is a subsidiary of DIAG. Source: F-YACHIR (1980) op cit. p692.

ANNEX 5:6

GLOBAL COST OF CONTRACTS FOR TECHNOLOGY ACQUISITION 1973 - 1978

(Cost in thousands of DA)

YEAR	NUMBER (1) OF CONTRACTS	GLOBAL COST OF CONTRACTS	TECHNICAL (2) ASSISTANCE AS PART OF TRANSFER	PURE TECHNICAL ASSISTANCE	SERVICES	SURVEYS	LARGE SCALE WORKS	TRAINING	(3) MISC.
1973	511	3634308	1023984	277918	2897918	130914	284819	18122	22466
1974	689	8972640	2747542	444152	1028918	345427	607089	223468	98488
1975	891	14470237	4672727	1030865	1151117	507542	1419473	443158	120572
1976	939	15360707	5083267	1294006	1367413	606393	1674897	103740	36818
1977	936	14646472	6609741	2026206	1283952	691792	2140256	359000	108535
1978	946	22315636	8684386	1646367	2379789	810244	3648079	159701	40206
TOTAL	4912	79400000	28821647	6719514	7500934	3092312	9774613	1307189	427065

Source: Ministere de la Planification (1980) "SYNTHESE DU BILAN" op cit. Annex IV-24 p315.

(1) Includes all form of contracts: survey and feasibility studies, engineering, equipment, erection of plants, turnkey, plant-in-production, training and technical assistance contracts.

(2) Includes training, training centers, and technical assistance provided under plant in production contracts after the erection of the plants. As well as civil engineering, supply of equipments erection of plants and start-up tests in turnkey and plant-in-production and separate contracts.

(3) Exclude training provided as part of contracts as in plant-in-production.

ANNEX 5:7

SONATRACH'S SUBSIDIARIES AND ASSOCIATED COMPANIES

YEAR	NAME OF THE SUBSIDIARY	FIELD OF SPECIALIZATION	SONATRACH SHARE	FOREIGN PARTNER
1966	ALFOR	DRILLING (FORAGE)	51%	Southern-eastern Drilling Co. (US) 49%
1967	ALGEO	GEOPHYSICAL WORKS	51%	Independex International Inc. (US) 49%
1967	ALTRA	PLANT'S CONSTRUCTION	51%	Union Industrielle et d'Entreprise (F) 49%
1969	ALFLUID	DRILLING (FORAGE)	51%	DAVIS MUD AND CHEMICALS (US) 49%
1970	AIDIA	ELECTRICAL EQUIPMENTS	51%	DRESSER INDUSTRIES (US) 49%
1970	ALTECT	DRILLING (SONDAGE)	51%	BAKER OIL TOOLS (US) 49%
1972	ALCOOME	INSTRUMENTATION	75%	GEAMIN (State Company) Romania 25%
1972	AIDIM	DRILLING EQUIPMENTS	51%	CHRISTENSEN DIMOND PRODUCTS (US) 49%
1973	ALCIP	PLANT'S CONSTRUCTION	51%	S AIPEM Italy 49%
1973	ALEIP	PIPELINE ENGINEERING	60%	D.P.T. (OMNIUM TECHNIQUE DE TRANSPORT PAR PIPELINE) 40%
1974	ALGEG	ENGINEERING AND CIVIL ENG.	51%	RUM W. Germany 49%
1974	ALCOTRA	ENGINEERING	51%	INCISA Italy 40%
1975	ALRID	INFRASTRUCTURE OF DISTRIBUTION	60%	E.N.I. Italy 40%
1975	ALRIL	REALIZATION OF INDUSTRIAL TRANSFORMATIONS UNIT	75%	PATTENTFIELD K.G. W. Germany 25%

SOURCE: - SONATRACH

- Revolution Africaine No. 412 March 2, 1972.
- R. Maniout (1974) "Le petrole Algeriene" ALGER ppl82-83
- F. YACHIR op.cit. p705.

THE EVOLUTION OF CONTRACTUAL FORMS IN THE IMPORTATION OF TECHNOLOGY TO ALGERIA

1967-1976(1)

INDUSTRIAL BRANCHES	CONTRACTUAL FORMS	ENGINEERING AND SURVEY STUDIES (2)			SUPPLY OF EQUIPMENT AND PLANT ERECTION			REALIZATION (3)			TURNKEY			PLANT IN PRODUCTION			TOTAL
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	
PETROLEUM INDUSTRY		1	-	-	1	-	-	2	1	-	1	4	6	-	-	1	17
GAS INDUSTRY		5	5	3	1	-	-	2	4	-	-	9	10	-	-	-	39
PETROCHEMICAL INDUSTRY		-	-	-	-	-	-	-	-	-	3	5	8	-	-	-	16
IRON AND STEEL INDUSTRY		4	5	5	9	13	7	1	-	-	-	1	1	-	-	1	47
MECHANICAL INDUSTRY		-	-	-	-	-	-	-	-	-	1	2	3	-	1	2	9
CONSTRUCTION MATERIALS INDUSTRY		-	2	-	-	7	2	-	-	-	1	3	12	-	-	2	29
ELECTRONICAL INDUSTRY		-	-	1	-	-	-	-	-	-	1	-	1	-	-	4	8
CHEMICAL INDUSTRY	1	-	-	-	-	-	-	4	2	-	-	-	6	-	-	-	13
TEXTILES INDUSTRY	1	2	1	1	7	5	-	-	-	-	-	-	4	-	-	6	26
MINING INDUSTRY	3	1	3	3	1	3	2	-	-	-	-	-	-	-	-	-	13
ENERGY (GAS & ELECTRICITY) INDUSTRIES	2	1	10	3	5	5	6	2	-	-	-	-	-	-	-	-	29
FOOD INDUSTRY	1	-	-	-	7	1	4	1	3	2	-	-	4	-	-	-	23
WOOD INDUSTRY	-	-	-	-	-	-	-	-	5	-	-	-	3	-	-	-	8
TOTAL		18	16	23	29	33	21	12	15	2	7	25	59	-	1	16	227

SOURCE: Collected from different sources, in particular: F. YACHIR (1980) "Les Fleur d'importation de technologies dans le secteur public en Algerie" Revue Algerienne Des science Juridique Economique et Politique Vol.XVI, No. 4, Dec. pp629-705.

A. BENACHENHOU (1980) "PLANIFICATION ET DEVELOPPEMENT EN ALGERIE 1962-1980" ALGER.

(A) - 3 YEAR PLAN 1967-1969

(B) - First 4 YEAR PLAN 1970-1973

(C) - Second 4 YEAR PLAN 1974-1977

(1) - This list of contracts are by no means conclusive

(2) - Excluding Engineering and Survey studies conducted by national enterprises for other NEs.

(3) - Excluding realization by NEs for other NEs.

ANNEX 5:9

INDUSTRIAL PROJECTS REALIZED AND BEING REALIZED AT THE END OF 1979

INDUSTRIAL BRANCHES	3 YEAR PLAN 1967 - 1969			4 YEAR PLAN 1970 - 1974			4 YEAR PLAN 1974-77 & INTERPLAN 1978-79			PROJECTS BEING REALISED AT THE END OF 1979			TOTAL
	A	B	C	A	B	C	A	B	C	A	B	C	
HYDROCARBONS	-	-	-	15	-	-	25	4	1	28	5	1	79
IRON AND STEEL	2	-	-	3	3	-	11	2	-	13	2	-	36
MECHANICAL & ELECTRICAL	-	4	-	5	9	-	18	10	-	11	3	-	60
CONSTRUCTION MATERIALS	-	-	-	4	6	-	40	7	6	27	4	-	94
CHEMICALS	-	-	-	8	-	-	11	2	11	28 ⁽¹⁾	2	1	65
MINING	-	1	-	7	-	-	3	1	-	6	1	3	22
ELECTRICITY	-	-	-	8	-	-	20	-	-	9	-	-	38
TEXTILES	2	-	3	2	-	-	4	-	2	19	2	-	33
LEATHER	2	-	-	1	1	-	4	1	1	3	-	-	13
AGRICULTURE & FOOD INDS.	1	-	-	17	2	2	16	6	6	70	7	2	129
WOOD, PAPER & MUSIC	-	-	-	1	2	1	12	4	1	24	3	2	50
LOCAL & CRAFT INDS.	-	-	7	-	-	30	-	-	78	-	-	578	693
TOTAL	7	5	10	71	23	36	164	37	106	238	28	587	1312

A: Large and medium projects

B: Extension of existing projects

C: Small projects

(1) including 11 large and medium projects in petrochemicals

SOURCE: Ministère de la Planification et de l'Amenagement du Territoire, As cited by the World Bank (1982) op. cit. p250.

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ROLE AND RESPONSIBILITY OF PARTNERS UNDER THE DIFFERENT CONTRACTUAL FORMS IN THE CASE OF ALGERIA

FORM OF CONTRACT	CONTRACTUAL PARTNERS		
	FOREIGN FIRMS	THE CLIENT NATIONAL ENTERPRISE	NATIONAL ENTERPRISES OF EQUIPMENT & REALISATION
PLANT IN PRODUCTION	<p>Engineering works</p> <p>Electromechanical engineering</p> <p>Purchase & supply of equipments</p> <p>Work supervision</p> <p>Training of manpower</p> <p>Erection of industrial plants</p> <p>Start-up tests</p> <p>Setting-up of production</p> <p>Technical assistance</p> <p>Communicate patents & licenses to the client national enterprise.</p>	<p>Investment and planning decision</p> <p>Recruitment of labour. Management of the plant at the end of initial management (3 to 4 years)</p>	<p>Possible sub-contracting from foreign firms.</p>
TURNKEY (entrusted to foreign firms)	<p>Engineering works</p> <p>Purchase & supply of equipments</p> <p>Work supervision</p> <p>Erection of industrial units</p> <p>Start-up tests</p> <p>Technical assistance.</p>	<p>Investment and planning decision</p> <p>Recruitment of labour</p> <p>Start-up tests</p> <p>Setting up of production</p>	<p>Possible sub-contracting from foreign firms.</p>
TURNKEY (entrusted to National Enterprises of realization & equipments)	<p>Possible sub-contracting from national enterprises of realization.</p>	<p>Investment & Planning decision</p> <p>Recruitment of labour</p> <p>Start-up tests</p> <p>Setting-up of production</p>	<p>Engineering works supply of equipments. Supervision of work. Erection of industrial units.</p> <p>Start-up tests</p>
Engineering with Importation of Equipments	<p>Engineering works</p> <p>Purchase & supply of equipments</p> <p>Diverse partial contracts for technical assistance training, realization etc with different partners.</p>	<p>Investment & planning decision</p> <p>Recruitment of labour</p> <p>Start-up tests</p> <p>Setting-up of production</p> <p>Coordination & supervision of works</p> <p>General engineering.</p>	<p>Diverse partial contracts</p>
Engineering with local supply of Equipments	<p>Possible partial contracts</p>	<p>Investment & planning decision</p> <p>General engineering</p> <p>Recruitment of labour</p> <p>Start-up tests</p>	<p>Engineering works supply of equipments.</p> <p>Diverse partial contracts</p>

GEOGRAPHICAL ORIGIN OF TECHNOLOGY IMPORTS BY ALGERIA: THE SEVEN LEADING COUNTRIES 1970-1975

INDUSTRIAL BRANCH	FRANCE 70-72 73-75	WEST GERMANY 70-72 73-75	USA 70-72 73-75	UK 70-72 73-75	ITALY 70-72 73-75	JAPAN 70-72 73-75	USSR 70-72 73-75	TOTAL
GAS	-	-	1	2	1	1	-	4
OIL	-	-	-	1	2	-	1	5
POWER	2	2	-	1	-	-	1	5
SHIPPING	1	2	-	1	-	1	-	4
MINING	-	1	1	1	-	1	-	5
INDUSTRIAL FACILITIES	1	10	1	4	4	-	2	2
INDUSTRIAL PROCESSING	2	3	1	2	3	1	2	14
FACILITIES	1	2	3	3	-	1	2	24
MACHINERY & EQUIPMENT	2	1	-	6	1	1	-	8
TECHNICAL TRAINING & ASSISTANCE	1	-	-	-	-	-	1	19
TRANSPORTATION-LAND	1	1	3	1	2	-	-	5
COMPUTERS	-	-	1	1	-	-	-	3
COMMUNICATIONS	2	2	1	-	-	5	-	10
AVIATION	-	-	3	-	-	-	1	12
AGRICULTURE	-	-	-	-	-	-	-	4
IRRIGATION & WATER	-	-	1	-	-	-	-	3
SUPPLY	-	-	1	-	-	-	1	1
PLANNING AND	-	-	-	-	-	-	-	3
MISCELLANEOUS	-	1	-	2	-	-	1	2
TOTAL OF CONTRACTS	11	8	13	22	5	13	11	68
% SHARE OF THE TOTAL OF 7 COUNTRIES	16.2	11.8	19.1	23.5	7.4	12.1	16.2	100
VALUE OF CONTRACTS IN MILLION OF DINARS	1391	1028	1777	25015	1007	3151	640	242591
% SHARE OF THE TOTAL OF 7 COUNTRIES	15.3	11.4	19.5	14.2	11.1	13	7.0	100

SOURCE: F.YACHIR (1980) op cit; US. Congress, Technology Transfer to the Middle East OPEC Nations and EGYPT 1970-75. Background study prepared for the Sub-Committee on Domestic and International Scientific Planning and Analysis of the Committee on Science and Technology, House of Representatives, September 1976; Abdelkrim ABIB (1976) "L'Acces a la Technologie: Le cas Algerien" Zurich ppl41-42.

ANNEX 5:12

SHARE OF COUNTRIES IN THE REALIZATION OF INVESTMENT IN THE
LIGHT INDUSTRIES 1974 - 1977

ORIGIN OF FIRMS AND ENTERPRISES	SHARE (in millions of dinars)	%	NUMBER of COMPANIES
ITALY	4499.19	19.66%	30
FRANCE	4381.27	19.14%	83
ALGERIA	3868.20	16.90%	191
WEST GERMANY	3772.32	16.48%	53
JAPAN	2218.19	9.69%	5
BELGIUM	2039.56	8.91%	16
SWITZERLAND	891.68	3.90%	18
SPAIN	614.88	2.69%	9
OTHER CAPITALIST COUNTRIES	240.32	1.05%	15
SOCIALIST COUNTRIES	362.27	1.58%	11
TOTAL	22887.22	100.0%	431

- (1) Comprise firms from Sweden, UK, Austria, Canada, and USA, 4, 4, 1, 3,3 firms respectively.
- (2) Include 11 companies from Hungary (4), Poland (2); China, Romania, USSR, East Germany, Bulgaria one company each.

SOURCE: Ministere des Industries legeres: Deuxieme Plan Quadrienal 1974-1977: Evolution des Engagements Contractuels des Entreprises Socialistes sous Tutelle du Ministere des Industries legeres en Matieres d'Investissement Planifiee" Fevrier 1979.

CHAPTER SIX
A CASE STUDY OF THE
ALGERIAN GAS INDUSTRY

Since October 12, 1964, when the world's first commercial cargo of liquefied natural gas "LNG" was successfully delivered to Canvey Island in the United Kingdom from an Algerian liquefaction plant "CAMEL" at ARZEW, Algeria's policy towards gas liquefaction in particular and gas industry in general has proven to be more ambitious. The transfer of gas liquefaction technologies, which were at their early stages of development and were available only to few highly industrialized countries[1], to a country with no industrial history is the root of the difficulties which a transfer of this type has created in matters of technology acquisition. To set-up liquefaction plants, Algeria needed to import techniques and experts whose collaboration was necessary. These techniques concerned all activities and related to: techniques of construction and assembly; technological processes; know-how, equipment and management of production units. To plunge rapidly into the industrial world, through massive importation of advanced technologies and without being prepared for it cannot be done by the gnashing of teeth.

A transfer along these lines has its success as well as its failure. Success, because the gas industry is now one of the greatest national assets and far more developed than that of potential gas producing countries, placing the country in a better position to meet

the projected growth of demand for natural gas. To export the country's proven recoverable gas reserves of nearly 3,000 billion cubic meters, the only available means was to liquefy it in order to get it to the consumer markets of West Europe and North America[2]. It is mainly because of the heavy investment in gas liquefaction industry undertaken by Algeria in the 1970's that it is today able to withstand the worst effects of oil glut[3].

The gas industry occupies a strategic place in the economic development of Algeria, for it will be the mainstay of the economy when oil production runs down. It is planned to become the country's main energy export and foreign exchange earner in this decade. Gas export (up to this moment in the form of LNG (February 1983) has already allowed the Algerian authorities to introduce a hydrocarbon conservation policy, especially oil. The policy is designed to assure adequate domestic supplies for the long term and to maintain a sustained growth of export volume over a longer period as well as the development of export alternatives to hydrocarbons. The decline in oil production and prices are being offset by the rise in gas prices, for which the Algerian authorities have dug in their heels to obtain a parity export between oil and gas. Such a rise enabled Algeria to absorb the downturn in export revenues from oil, better than many other oil producing countries, and not to curtail the 400 billion dinars (US \$100 billion) expenditure allocated to the 1980-84 development plan[4].

However, the overall success is not matched by an equal success in the field of technology transfer. If the former can be regarded as

a success, the latter can only be considered a failure. Taking into account Algeria's status of under-development, the major cause of such a failure can be attributed to the employed method for the transfer, namely the transfer in the form of turnkey plants. The transfer by means of turnkey plants, especially when it necessitates the calling-up on autonomous foreign engineering companies and experts not only to construct industrial units but also to run them, is not an easy path for the training of manpower. In other terms the technological problems being faced today in most of Algeria's liquefaction units have their roots in the method under which the technologies have been transferred.

The technological difficulties of the gas industry can be advanced as a total dependence on foreign technical assistance at the production level. The causes of such dependence are on one hand, the imported technologies do not only require a substantial amount of investment but are also very complex and capital intensive. On the other hand, the development of liquefaction units require highly qualified manpower, and their sophistication has made their mastery more and more arduous. As a result, Algeria had to resort to massive importation of technical assistance from a very limited number of multinationals "MNCs" whose supremacy is recognised world-wide.

Unlike other industrial branches where the recourse to technical assistance of the same constructor or autonomous firms is in most cases limited to the realization of industrial projects, the gas industry relies heavily on the continuous existence of technical

assistance at the production stage. If, for example, all foreign experts were to leave the liquefaction units, the production of LNG will be brought to a standstill. The realization of production units under turnkey contracts can not give a sense of technology transfer unless the recipient enterprise has the necessary manpower to run the constructed units. Technology is not only the acquisition of licence, know-how and erection of production, but more significantly the acquisition of the undocumented knowledge concerning the functioning and the management of the imported technological elements. Thus, the rely on foreign technical assistance, in the case of the gas industry, has only served to mask the proper failure which is expressed by the high cost burden.

The cost of technical assistance within the gas industry reached an unprecedented level rendering the establishment of liquefaction units to no more than a waste of non-renewable resources, and an employment agent of foreign enterprise. In 1980 the Algerian Minister of Energy and Petrochemicals M. BELKACEM NABI declared that the gas production for 1978 and 1979 was exchanged for the services of technical assistance. In other words, in these two years, the expenditure on technical assistance was equal to the revenue obtained from gas:

"In 1978, we had exchanged men for gas. In other words, the Algerian gas revenues were equal to the expenditure on technical assistance. This is also true for 1979" [5].

The main concern of this chapter is the liquefaction unit at Arzew known as LNGL, which was the result of a contract for the supply of LNG to USA between the Algerian state owned oil company SONATRACH and

the US firm EL-PASO Corporation. However, first a brief summary of Algeria's gas installations and related difficulties will be given which would facilitate a better understanding of the problems of technology transfer within the industry. The transfer of advanced technology to a country with no industrial experience means that a country may financially be capable of buying the latest of equipments and process, but not the industrial knowledge and expertise, especially when they concern a monopolized technological field by few MNCs.

FIRST: Liquefaction plants. A liquefaction plant is the heart of any LNG project. Normally, it is located at the LNG loading port - either ARZEW or SIKDA in the case of Algeria - and linked to the gas producing fields - Hassi R'Mel - by pipelines. The plant itself is concerned with the basic processes of gas purification and then liquefaction[6]. An LNG plant also requires a huge power station and cooling water facilities, as well as a loading harbour, which are an integrated part of any projected LNG plant.

Unquestionably, Algeria has at present, at least in terms of seniority and number of launched projects, the more complete experience in the field of gas liquefaction. However, being the first in the field for a country with no industrial experience is no remedy. As a result of neither being able to design or construct, nor manage the liquefaction units, the country had to face many difficulties and abuses by the foreign firms.

(A) THE CAMEL PLANT: (Now renamed GL4Z)

CAMEL (Campagnie Algerienne de Methane Liquide), the world's first gas liquefaction plant was built with French and English capital[7]. The foundation stone of the plant was laid on September 14, 1962 by BenBella, the Algerian President at that time. It is thought to have cost 31 million pounds[8]. The plant was constructed by TECHNIP (France) and PRITCHARD RHODES (UK). Using the French liquefaction system "Cascade", the plant was designed to liquefy 1.8 billion cubic meters per year[9]. Two thirds of the output were allocated to British Gas Council (Canvey Island) for 15 years and the rest to Gaz de France (Le Havre) for 25 years (see Annex 6:1 and 6:2).

Although the production started in 1964, the construction operation in fact ran into 2 years of delay and was not completed until 1966. Apart from some temporary problems between Algeria and France after the 1971 nationalization, the plant by any standard has been successful. Nonetheless, the formerly technologically leading installations are regarded today as being rather out of date. New facilities require 30% lower investment. At the end of 1979, there was a possibility that SONATRACH may shut down the plant due to the weaknesses of equipment. However, since the plant employs 474 personnel[10], SONATRACH seems to have decided to replace the equipment. The decision may also have been influenced by the cancellation of LNG3 at Arzew.

(B) LNG SKIKDA (The first three production lines)

Algeria's second liquefaction plant was completed in 1973, but things did not go as smoothly as in the Camel plant. The plant suffered considerably from technical difficulties after the French shares in the mixed company SOMELGAZ were taken over by SONATRACH[11]. The feasibility studies for the construction of the first three production lines started in 1966. Two firms competed for the bid to construct the plant: the West German firm MESSER, which proposed an intermediary system of liquefaction process, the classical "CASCADE" process, and the French firm TEAL - (grouping two French companies TECHNIP and AIR LIQUIDE), which proposed an incorporated new "cascade" system called TEAL[12]. The latter process was retained.

The construction was awarded to TECHNIP under a turnkey contract, which sub-contracted the construction of the "heat exchanger" to TEAL, the "boiler" to STEIN who supplied it jointly with ROUBAUX (both French companies). A unique prototype turbine for the compression was constructed and supplied by CEM (France) and BBC (Switzerland). The installation and the supply of the alternators was sub-contracted to the West German firm AEG. Only the excavation works were sub-contracted to Algerians - (to the military civil engineering). As the contract was in the form of a turnkey plant, TECHNIP was in charge of coordinating and supervising the works of the sub-contracted firms. (see Annex 6:1).

The construction of the plant was not exempted from conflicts between the two contracting parties. Under the terms of the contract,

the delivery of each of the three production lines could only be made when at least 80 percent of the anticipated capacity is reached. The conflict rose when one of the production lines functioned at full capacity, but only for a short time. TECHNIP, considered its contractual responsibility as being absolved. The view of SONATRACH was that TECHNIP could not be released from its contractual obligation while certain weaknesses were still noticeable and where certain parts of the installations needed to be repaired. It threatened not to sign the documents absolving TECHNIP from any responsibility. This conflict brings to light the question of start-up tests. On one hand it shows the non-significance of these tests when they are carried out on subunits basis rather than on the whole installations as it is the case here. On the other hand, even if tests were carried out successfully, problems could appear a long time after the final delivery of plants. Such a conflict can only prove the inconvenience of turnkey contracts and their application in a strategic and large scale industrial complexes by national enterprises who lack the technical capacity to check the abuses and malpractices which in many cases are disguised until the constructing firm's responsibility is absolved.

When the plant went into production during the summer of 1972[13], it was the biggest and most modern plant of gas liquefaction in the world[14]. This technological advance explains the technical difficulties caused mainly by the introduction of the new liquefaction process and its incorporation to equipments supplied by different foreign firms.

"... This factory had known many misfortunes. Put into service in the summer of 1972, it broke down in December of the same year, due to troubles that occurred in the compression system. After restarting the factory, it broke down once again in December 1973, as the heat exchangers were failing. Soon after it started functioning in February, the production was interrupted at a request of Sonatrach. Unexplainable marks of mercury were found in one of the production lines which had functioned the longest out of the three lines, and the Algerians were willing in this case to assert that it was not a matter of default in the manufacture"[15].

The technical difficulties which the plant had seen, provoked delays in the supply of LNG to Gaz de France (GDF). For example, in 1978, GDF received only 2.55 billion m^3 , instead of the contracted volume of 3.7 billion m^3 , or about 73%. The 2.55 billion m^3 , represents in fact only 56.6% of the installed capacity of 4.5 billion m^3 . However, the anticipated capacity of the three production lines was fixed at about 80%, in order to satisfy the GDF contract[16].

The Skikda's liquefaction plant supplies about 15% of France's need of gas. Thus, as a result of the three production lines being put out of action in December 1973[17] and then the break down of the first line in February 1974[18], SONATRACH ordered the shut down of the whole plant. It led to speculation that Algeria may be purposely delaying the supply of gas in order to ask for a big increase in the price of LNG. The shut down was originally planned

for the summer of 1974 in order to allow for the overhaul of the plant, and it coincided with labour disputes in the French coalmining industry. The cut in gas supplies caused power shortages, where the badly hit industries were fertilizers, petrochemicals and steel. To allow for industrial production to continue, the French Government introduced gas rationing measures[19]. The speculation was also based on the report of TECHNIP's engineers who were sent to investigate the operating problems of the plant and reported that the two other production lines were in working order. As well as this, a delegation from GDF visited the plant and received no indication from Sonatrach of when supplies could be expected to be resumed.

Although the overhauling of the plant, discovered traces of an explainable mercury in three proudction lines[20], the shut down was seen not much as a coincidence, but rather as poker tactics employed by SONATRACH over the gas prices. The speculation may not be without foundation, since on one hand, a few months later, President Boumedienne called for a just financial remuneration for the huge investment in gas developments in his message to the Fourth Liquefied Natural Gas "LNG" Congress which concluded its four day meeting in Algiers on June 27, 1974[21]. At the same time negotiations were underway between SONATRACH and several US gas distribution companies, where the former was seeking a 400% increase in the price of LNG. On the other hand, SONATRACH had infact cut supplies to EL-PASO in support of prices increase in 1980. The same tactics were employed in the negotiations with ENI of Italy, Algerian approved the trans mediterranean gas pipeline, which was completed in September 1981, but it did not settle a firm price until February 24, 1983[22].

The difficulties mentioned above may also have been the result of the shortage of qualified manpower to run the installed technologies. The efficiency of these sophisticated technologies was not proven prior to their introduction in Algeria and in some cases were not even mastered by the experts of the constructing firm. Thus, whenever a breakdown occurs in the plant SONATRACH calls directly upon the sub-contracted firms who are sometimes the donors of licenses instead of relying essentially on the services of TECHNIP[23].

When the plant went into service the exploitation was initially assured by Algerian personnel with A-levels (Baccalaureat) level of education and complementary technical training provided for by the contract. However, the advanced and complex technologies of gas liquefaction called for a team of engineers and technicians of high skills which were not locally available and had to be hired directly from abroad. The majority of which were hired from the constructing firm TECHNIP, but on January 14, 1979 SONATRACH concluded an agreement with Gaz de France, a technical assistance agreement under which the latter would supply the former with a hundred engineers and technicians to run the plant[24].

(C) The Cancellation of the VALHYD PLAN[25]

In the previous development plans, the development of industrial basis was placed by Algeria as a top priority[26]. Although the present plan 1980-84 reflects a slowing down of investment in industrial projects, nonetheless the role assigned to industry remains

an essential one since the planned investment is 154.5 billion dinars (about US \$40 billion), representing a share of 38.57%, compared with an actual share of 43.55% in the 1974-77 plan. However, the scheduled investment of 38.57% for the present plan may in fact be greater than anticipated. The causes of this overcost are multiple and include: lack of infrastructure, large scale projects, sophisticated technology, complex integration of production systems, complexity of the procedures which the executing agencies had to follow to obtain financing and to import the necessary equipment for projects, and above all, the shortage of qualified manpower which meant that workers and supervisors had to be trained during the construction of projects[27].

The review of the industrial situation, conducted in the first two years of the President Chadli Bendjedid's Government (1979 and 1980) attributed the appearance of these problems and their exacerbation to two main factors. On one hand, the boom in hydrocarbon exports and revenues and an industrial investment beyond the physical capacity of the Algerian economy to accumulate capital, and, on the other hand, the dearth of planning resources and the lack of social mastery of development meant that the boom could not have been corrected in time[28]. What the review failed to mention is the fact that industrial planning and execution during the same period was centralized and highly concentrated in the hands of few bureaucrats; and thus, leaving wider room for corruption especially in the awarding of contracts to foreign firms for the realization of industrial projects.

The overall slowing down of investment embodied in the 1980-84 development plan is intended to bring about a realignment of the economy, whereby the sectors in difficulty - (housing in particular) - will be brought into step with the industrial development. Thus, most of the investment is being allocated to foster the light industries that meet consumption and demand as well as to complete the on-going projects in order to achieve linkage with existing industries and relieve strains on the use of existing facilities. Emphasis is also given to the agricultural sector and generally to projects that are labour intensive. It is important to note that during the previous plans, and despite the fact that the actual cost was higher than the planned one - (in terms of monetary value), the percentage of actual investment decreased in all sectors except in hydrocarbons and non-hydrocarbon industries[29]. It is such a situation which the present plan intends to redress. To sum-up, there is an apparent indication that the policy under the plan is bringing about an inhibitory effect on the policy of industrialization.

The slowing down is more evident in the hydrocarbon sector where the allocated investment to the development of hydrocarbons is the lowest since 1970 (in terms of percentage) 63 billion dinars (about US \$ 15 billion) was allocated to the sector representing 15.73% of total investment. However, the planned investment is in fact lower if we consider the 28.4 billion dinars designated for the completion of projects from earlier plans[30].

In 1979, the Government decided to correct the economic and social imbalances inherited from the previous regime. This decision

first became evident in the revision and the postponement of some industrial investment projects.

The main action was the halting of the Hydrocarbon Development Plan (Valorisation des Hydrocarbures) known as the VALHYD PLAN. The Plan was prepared in 1977 for SONATRACH by BECHTEL International Corporation of the US[31]. Its objectives include; the recovery and utilization of gas associated to the production of oil, and to maintain a volume of gas sales as stable as possible and over the longest period possible[32].

To realize these objectives and in accordance with the VALHYD PLAN, SONATRACH must undertake the following programmes between 1976-2005:

- (i) The drilling of about 2760 wells for development (Gas and Oil);
- (ii) The installation of appropriate collection and servicing systems;
- (iii) The construction of 11 treatment units of non-associated gas (5 at Hassi R'Mel alone) of a total capacity of about 150 billion cubic metres a year;
- (iv) The construction of 8 reinjection stations of a total capacity of about 84 billion m³ per year, out of which 60 billion cubic metres at Hassi R'Mel;
- (v) The construction of 7000 kilometer (4375 miles) of pipelines;
- (vi) The construction of 5 or 6 new gas liquefaction plants;
- (vii) The construction of separating units for liquefied Petroleum gas "LPG" of a capacity of 9 million tons a year as well as the facilities for stocking and loading; and

(viii) The construction of 4 new refineries with a total capacity of 29 million tons a year[33].

The estimated cost for the VALHYD PLAN is 140 billion dinars (about US \$ 33.4 billion) at 1976 prices. Two thirds of the required investment was allocated for gas development. An important part of the investment has to be provided through foreign borrowing, about US \$ 17.4 billions, or 52%; of which US \$ 12 billion will be for gas, or 69%. The mobilization of external borrowing was expected under the VALHYD PLAN to reach 3 billion dollars a year between 1978-1980, or half of the borrowing, while reimbursement of debts (principal and interest) was scheduled at US \$ 250 million in 1979 and only reaches US \$ 2.7 billion in the years of 1983-1986[34].

At first sight, the VALHYD PLAN appears to be quite attractive to Algeria. Since, on one hand, it would lead to the development of the hydrocarbon sector - in particular the gas industry - and thus resulting in higher production and, on the other hand, higher production would lead to higher revenues. The latter being projected to continue rising each year, to reach US \$ 37,6 billion during the period of 1978-1982[35].

The other side of the coin projects the rundown of production as well as the entry of cash flow by the year 2005. In following the Plan's projections, the accumulated debts of US \$ 17.4 billion (excluding interest rates) would be repaid at about the same time of the running down of production.

In balance, the Plan is in fact more disadvantageous to Algeria than it seems to indicate at first. It can be criticised on the following grounds.

Firstly, the VALHYD PLAN not only fails to take account of Algeria's future need for non-renewable natural resources, but rather seems to aim at exhausting the existing reserves in a record time of 25 years, without denunciation that the country may find itself without raw materials for its industries and without energy (the same industries for which the sales of hydrocarbon is designed to implement). Gas is not only an energy resource but above all a raw material from which numerous products are derived (i.e. fertilizers for agriculture). In the words of a trade unionist:

"The VALHYD PLAN aimed at exhausting our resources in a record time. Had we not been able to denounce it in time, we would have found ourselves without raw materials for the industry and without energy"[36].

Secondly, it is unrealistic to suggest the installation of more advanced technologies while the existing plants are neither completed nor efficient. Furthermore, investment in the hydrocarbon sector is often higher than anticipated due to: (i) trial and errors in the introduction of new technologies, especially for gas liquefaction, (ii) delays in execution which entailed overcost, and (iii) high running cost because of heavy reliance on technical assistance.

Thirdly, it is not in the national interest to overproduce so that the consumer countries are assured of future supplies, since gas

is a difficult fuel to replace on short notice and unlike oil there is no spot market. Furthermore, it is much more expensive and technically challenging to hold large strategic stocks of gas as compared to oil. Of course, Algeria will continue to produce and sell hydrocarbon resources but the volume of export of these resources will have to be in parallel to the country's need for import and foreign currencies, and taking into account the future domestic demand and supply for these resources, as well as the development of non-hydrocarbon industries. Such industries would be called upon to ensure the transition when hydrocarbon will feature less prominently in Algeria's external trade.

Finally, it is equally unrealistic to develop the hydrocarbon sector to the projected level and to end up in 25 years with industries which the country may not have any use for or are too costly to run. It is also not economical to add \$17.4 billion in debts to develop the sector so that such debts can be repaid at the end. Moreover, while the sector's investment was the highest, there is no evidence to the contrary which may suggest that the cost of the Plan will be limited to 33.4 billion dollars. Higher investment was not matched by higher employment. In fact, the share of the sector was relatively small, 2.8% in 1977[37]. For example, for each \$2.5 million invested in the LNG plant at Arzew, only one single job was created, half of which are occupied by foreign personnel mostly Americans[38].

It may be possible that the scenario for the VALHYD PLAN was prepared under the following assumption by BECHTEL. In order to ensure

the supply of gas to Western European countries and United States, Algeria has to develop its hydrocarbon resources, so that the Western European countries would not become vulnerable to Soviet gas leverage. The Americans believe that the Algerian gas is one of the alternatives, which could serve better European economic security and political interests[39].

However, for Algeria to be in such a position it has to develop its hydrocarbon resources. In doing so, numerous oil and gas equipment would have to be bought from MNCs. To set-up the imported technologies, the country would call upon the services of the same MNCs, since local capacities cannot fulfil the task by themselves. At the same time, Algeria would have to borrow from the international financial market - so that financial institutions will make profit through interest rates - to buy these equipments, so that these MNCs would keep their labour force on the pay roll. Furthermore, to make additional profits, they will provide Algeria with their engineering and expertise services.

At the political level, the VALHYD PLAN may also have been designed to steer Algeria away from its radical position in international affairs. It would have made Algeria more vulnerable to pressure from the technology suppliers whenever there is a breakdown or even from the consumer countries through the cancellation of gas supply contracts.

It is no wonder when the new government under Chadli Bendjedid took power in February, 1979, considered the short and long term

economic and political impact of the Plan on Algeria and came to the conclusion that investment in the processing of natural hydrocarbons prior to export will have to be suspended if not abandoned. Accordingly, the Algerian Government cancelled GNL3 in 1980 for which the construction contract was already awarded to Foster Wheeler in 1976 at an initial cost of \$1200 million[40]. Plans have also been abandoned for the construction of LNG4 at Arzew and a second liquefaction plant at Skikda LNG2 as well as the liquifaction plant at Isser near Algiers[41]. Apart from the reasons mentioned already, the decision to halt investment in gas liquefaction plants was also influenced by the higher than originally anticipated cost of liquefaction facilities, and the reorientation of gas export towards European markets through the trans-Mediterranean pipeline to Italy.

SECOND: Gas Transportation[42]

(1) HASSI R'MEL-SICILY TRANSMED PIPELINE:

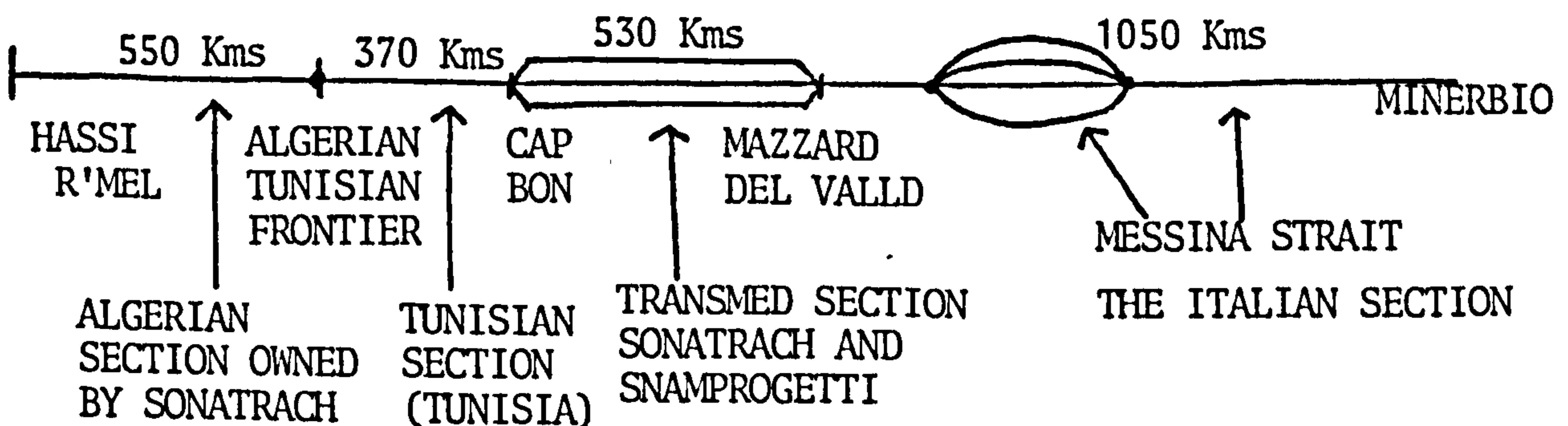
The first underwater pipeline was constructed in 1981 and could have become operational had it not been for a price dispute between SONATRACH and ENI of Italy. The pipeline provides a physical link that promises to bind the economic interests of Algeria and Italy together. The project was first conceived 22 years ago by Gaz de France when Algeria was under the French colonial. Gaz de France experimented in 1960, with the laying of 228 millimetres diameter pipeline at a depth of some 2000 metres between the Algerian and Spanish coast[43].

flexible laying. This section is jointly owned by SONATRACH and SNAM PROGETTI (a subsidiary of ENI).

4. The Italian section joins MAZZARA DEL VALLO in Sicily with Minerbio (near Bologna) on the Italian mainland. To cross the strait of Messina, the pipe is divided into four sections which joins again on the mainland. The line runs for 1050 kms and is owned by ENI[44].

The underwater section was engineered by SNAM PROGETTI, which was awarded the construction contract on October 22, 1977. The successful laying of the line at a record depth not only gave SNAM PROGETTI an experience which no other company in the world possesses, but above all it opened the possibility for a second pipeline under the Western Mediterranean between Algeria and Spain.

The estimated cost of the pipeline is \$2500 million, or one million dollars for each kilometre. The estimated cost is in fact equivalent to the construction of Arzew LNG. Algeria's share of total construction cost is \$1400 million, of which \$1030 million was obtained as a loan from Italy[45].



The commercial success of frozen gas LNG temporarily put the pipeline project into shade. In 1970, a further study undertaken by an Italian firm showed that there was no advantage to be gained at that time, and no overwhelming cost advantage in delivering gas direct from pipeline rather than LNG. However, the project of connecting Hassi R'Mel gas field to Sicily in Italy became firmer when the Italian company ENTE NAZIONALE IDRUCABURI "ENI" and SONATRACH signed a contract under which the latter undertook to supply the former with 12000 million cubic metres a year of pipeline gas for 20 years. The construction of the pipeline involved 2500 kilometres, divided into four sections:

1. The Algerian section which runs from Hassi R'Mel gas field to the Tunisian border for 550 kms long in a single pipeline. The line is 1219 mm in diameter and climbs to a height of 850 metres in the foothills of the Atlas mountains. This section is owned by SONATRACH and was constructed by ENI.
2. The Tunisian section runs from the Algerian frontier to Cap Bon, which is 370 km. Then, the pipeline plunges into the Mediterranean sea. This section is owned by Tunisia.
3. The Trans-Mediterranean section runs underwater from Cap Bon in Tunisia to MAZZARA DEL VALLO in Sicily. The section is 530 kms long and consists of three sealines of 580 mm in diameter. The three parallel lines serve the purpose of reducing the effects of breaks or other difficulties during operating as well as to allow for more

The initial capacity of the pipeline is 12000 million m³ a year but according to SONATRACH the capacity may be raised to 18000 million m³. The duplication of the pipeline is almost certain to take place, since on one hand Italy has already made it known that it is willing to double the Trans-Med. capacity depending on the quantities of Algerian gas available for export in non-liquefied form and whether customers from Central and Northern Europe prefer to import via Italy[46]. On the other hand, Greece has already decided to opt for an Algerian pipeline gas. In the words of Greece's Energy and Minerals Minister, Miltiades Evert "We have studied the Trans. Med extension project submitted in March (1980) by Italy's Snam Progetti. We think this is a good and feasible option; ... We are trying to limit our dependency on oil imports and Algerian gas looks like the good solution"[47].

(2) ARZEW (ALGERIA) - ALICANTE (SPAIN) PIPELINE:

In 1980, the feasibility study for the construction of the second under water pipeline was completed. A pipeline company Societe d'Etudes du Gazodue de la Mediterranee Occidentale (SEGAMO), was established for the purpose of studying the project[48]. The pipeline will serve the Spanish and the French markets though it won't be constructed until the Hassi R'Mel - Sicily becomes full operational. It should be noted here that the pipeline was originally projected to connect Hassi R'Mel-Tangier-Gibraltar-Spain and France[49]. However, the dispute between Morocco and Algeria over the Western Sahara, led Algeria to opt for a direct connection between ARZEW and ALICANTE.

SONATRACH-EL PASO CONTRACT

Prior to the signing of the contract on October 9, 1969, the French advanced a theory called the "Algerian captive gas", founded on arguments taking into account economical, technological, geographical and political elements. It pretended to establish a double postulate; First, the Algerian gas is necessarily destined for the European market, such market being the natural and possible outlet and consequently a condition for its promotion. Second, the supply of Algeria's natural gas to the European market was not conceivable except when combined with the French market, presented here as essential.

Obviously, the French interests are cleverly hidden in such theory. Since, in practice the theory means that Algeria cannot sell its gas except through the French market, this gives the French companies the first role of buyers. It is designed to give impression to the might be clients of Algeria's gas, or even to the Algerian authorities for that matter, that to promote the Algerian gas, such gas has (i) to pass through the French market, (ii) technologically use French patents, know-how and liquefaction processes; (iii) financially through French banks; and legally through the French oil companies who held concessions of Algeria's deposits[50].

Equally, the French strategy appeared to have been based on freezing the sale of Algerian gas to Europe. As a result, Algeria did not sign a single contract up to 1969, apart from the CAMEL

contracts[51]. Not surprisingly, the French Government and Gaz de France, played a leading role on promoting the sale of gas of Algeria's competitors. For such a role, they were assured of the cooperation of the Italian group ENI[52] and the American corporation Esso.

The campaign against the Algerian gas and its commercialization to Europe was based on the following themes:-

(1) Algeria cannot dispose of its gas since the gas belongs to concessionaries and nothing can be done without their consent and participation. This falsehood was designed to make the might be European client hesitate, and presents Algeria as a country who has wealth which it does not own.

(2) Algeria - according to the campaign - does not offer sufficient guarantee of stability and to sign an agreement with it is to be on the losing side. In other words, the multinational oil companies were attempting to substantiate the idea that they are the only ones capable of assuring regular supplies to the consumer countries. At the same time, to brush off any direct relationship between sovereign states (producers and consumers) which would reduce if not eliminate their role. Therefore, the argument of political stability is only a means by which MNCs would extend their power over the producing countries.

(3) The third theme of the campaign was that Algeria is unable to

realize gas liquefaction projects since it has neither technicians nor the necessary capital. The oil companies, thus, presented themselves as the only ones who are capable of furnishing these means to Algeria and wanted to anchor the idea that they are essential to the realization and development of gas projects[53].

Certainly, Algeria did not ignore the fact that for the realization of industrial projects it must obtain technical assistance. However, such assistance was not the monopoly of oil companies and could be obtained from constructors as well as friendly countries where the technological level is quite high. To ensure the financing of projects complementary financial capital is needed to be raised. Here again, the oil companies, despite their wealth and influence, did not have a total monopoly over the international capital market. It is important to note the manouvres employed by certain companies - especially American ones - with the World Bank. The World Bank has in fact showed interest in the Algerian projects for the exportation of natural gas which Algeria had submitted during the summer of 1966[54]. However, American companies pressurized the World Bank to adopt an attitude of wait and see. To see whether Algeria could finally accommodate the foreign private sector, it was a long wait. The purpose behind such attitude was to subordinate Algeria and force it to accept an eventual intervention of the Bank to an agreement between Algeria and the private sector, under which the latter would get advantageous terms and a dominant position[55].

The campaign against the Algerian gas, nonetheless, succeeded in organizing a veritable blockage which managed to fail all attempts by Algeria to penetrate the European market. Such blockage was helped by gas suppliers from the Soviet Union and Libya[56]. The commercial attitude of the Soviet Union was in particular denounced by the Algerian authorities during 1967. Such attitude was supported by the fact that the Soviet Union was importing Iranian gas and exporting it to Europe[57]. It is difficult to find the real intention behind the Soviet's attitude, except to suggest that the gas prices were sacrificed in order to obtain a share of the European markets. Such share would allow the Soviet Union to gain access to techniques and technologies which may not be developed in USSR.

The critical problem which faced Algeria then was to find a way of getting out of the blockage. A unique chance presented itself when a Canadian firm proposed to SONATRACH in 1968, the setting-up of a sale operation of gas in the East of Canada with the possibility of an important operation to sell gas to the American market. To Algeria the possibility of a deal represented more than the sale of gas. Firstly, in the economic field the deal would have meant the realization of a gas project which by its exceptional size constituted a vehicle for the launching of the development of gas reserves.

Secondly, in the commercial field, a share of the American market not only would enlarge the possibilities for the expansion of the sale of gas which was arbitrary and confined to the Mediterranean basin, but may also serve as a starting point to attract more American firms to

join Algeria's industrialization process which would significantly contribute to the diversification of technology supplies adopted by the country as a result of the oil conflict. If the deal was to go through, it would prove wrong the theory of "the Algerian captive gas", and increase Algeria's negotiating power vis-a-vis the might be European clients.

Thirdly, at the political level the deal would demonstrate Algeria's willingness to take charge of the development of its hydrocarbon resources, rather than the oil companies. Equally, it would demolish the technical, commercial, and financial myth which the French oil companies pretended to exercise over the exploitation and exportation of Algeria's gas.

The SONATRACH-ELPASO NATURAL GAS contract which was signed on October 9, 1969, involved more than the supply of 10 billion m³ of LNG a year for 25 years to the United States. For such a quantity to be delivered, an industrial chain had to be set-up first which included the following:-

- (i) The construction of a six lines liquefaction plant at Arzew LNGI, covering about 70 hectares, with 10.5 billion m³ capacity a year;
- (ii) A plant at Hassi R'Mel gas field for the extraction and treatment of gas;
- (iii) A pipeline for forwarding gas from Hassi R'Mel to Arzew, of 511 kms;
- (iv) Three storage tanks of 1000,000 m³ of LNG each;

- (v) A power station for the production of electricity; and
- (vi) The construction of a new methane port at Arzew (ARZEW ELJADID) [58].

Since the signing of the contract, both Gaz de France and the French Government tried to persuade EL-PASO officials to drop the deal. They argued that the Agreement of 29 July 1965[59], does not give Algeria the right to sell its gas without the consent of the French oil companies. In other terms, Algeria had to get first the green light from the French Government and its oil companies. One has to remember, that it was not only gas which the French were worried about, but also French technologies; finance, and the prospect of losing part of the Algerian market to American companies (e.g. the supply of industrial machinery, equipment, and manufactured durable consumer goods). However, such agreement backfired, since one year later, Algeria replied by taking 100% control of all gas reserves and pipelines[60].

The French oil companies did not give up easily. They threatened to take legal action against EL-PASO. The latter replied through its chairman who declared that the French oil companies had no legal grounds for taking action against the American buyers of petroleum and gas to which the former retained ancient interests[61]. Even if the nationalization did not take place, Algeria would have been able to sell gas. Since the French have accepted in the 1965 Agreement that Algeria had the exclusive right of buying gas from the French partners at wellhead.

Furthermore, the right of a state to nationalize its natural resources is well recognized under international law.

Then French Petroleum Company (Compagnie Francaise des Petroles) "CFP", tried to intervene in the debate of the Federal Power Commission (FPC) in the beginning of June 1971, and to oppose the projected importation of Algerian LNG by EL-PASO[62].

The French Government also played its role. It took steps with the US State Department to ensure that the US EXIMBANK rejects the request by SONATRACH for the financing of the project. The Bank had already accepted in principle to finance the project "engagement preliminaire"[63].

The scheme to import gas to US was without precedent in the history of The United States. Never before had anyone imported LNG to the East Coast in volumes big enough to provide utilities with a base load supply of gas. Until 1973, all that existed was the contract. This is due to the fact that the importation of gas to US needed to be submitted to the approval of the US Federal Power Commission. The Commission took four years to give its blessing. The project was described by one observer "as a long trail of tears. The first drop descended when the company set out to clear the necessary hurdles. EL-PASSO naively assumed the pathbreaking venture would glide past the Federal Power Commission without undue incident in less than 18 months"[64].

The delay of the process for the approval of the deal was due to the bureaucracy of the Commission on one hand, and on the other hand, due to the many arguments advanced by those who objected to the deal. American mining and oil companies claimed that the Algerian Government cannot be relied upon to honour its international commitments[65]. Others claimed that the import price was unreasonably high and contrary to public interest[66]. Other oil companies, including the Sierra club and Superior Oil Corporation argued that the price was unfair to the domestic producers[67].

From all the industrial chain which needed to be realized before any supply could take place, the liquefaction plant required more time. The construction of the plant LNG1 was awarded to Chemical Construction Incorporation of the United States on April 6, 1971[68], under a turnkey form of contract. The process belonged to Air Product (US), which is the same process employed in the Libyan liquefaction plant at MARSALA EL BOUGHA. A total of 17 firms from the United States supplied the equipment for the plant and thus making the fears of the French come true[69].

The construction did not start until 1974 instead of the planned start in 1972 because of the delay by the FPC. By the end of which, it became apparent that, there were difficulties and delays in the construction. In May 1975, CHEMICO asked SONATRACH for a renegotiation of the contract terms. It asked in particular for the contract's value to be raised and argued that events have changed (inflation, increase of petrol prices, and binding bureaucratic

procedures by Algerians...)). After three months of negotiations, SONATRACH became convinced beyond any doubt that CHEMICO was not only less qualified but dishonest as well. Its personnel were exercising a veritable change in order to exploit for their benefit financial stakes which the achievement of the plant would represent.

Although the change of events which CHEMICO based its argument did prevail prior to the start of construction and would have made it more appropriate had CHEMICO evoked them then, and despite the fact that improvements were needed as early as 1975 of the work then conducted under the responsibility of CHEMICO, Sonatrach accepted in principle to renegotiate the value of the contract. For this reason, Algerian and American experts gained access to CHEMICO's account documentation in its Head Quarters in New York. The investigation led to the discovery that CHEMICO had inserted expenditure undually put as expenditure on the plant but which were totally strange to the contract's terms.

At one stage of the re-negotiation, CHEMICO asked for an increase of US \$70 million and ended up by raising its demands to ask for nothing less than the total allowances of the contract. The value of the contract was 2000 million dinars (\$540 million) [70]. In order to continue the work, it required that SONATRACH would accept a new contract which will not commit CHEMICO in anyway neither in delays nor in price.

The behaviour and practices of CHEMICO constituted a reason for SONATRACH to fire the former after it became clear that it could not meet the contracts terms [71].

The cancellation of CHEMICO's contract was the second crisis which the contract SONATRACH-EL-PASO had gone through. The conflict which marked the financial negotiations gave SONATRACH a second chance to show its American partners of its willingness to continue with the realization of the project so that supply of LNG can start but not in 1976 as originally agreed. Also, that it can not go beyond the fixed limits of Algeria's legitimate interests. BECHTEL (US) was chosen at the end of 1975[72] to replace CHEMICO. BECHTEL took one year to finish its feasibility and survey studies which is a relatively short period considering the mess which CHEMICO had left behind. BECHTEL was able to conduct the construction up to the starting-up operation with exceptional success.

The accumulated delay by the first constructor, as well as those inherited when the work was abandoned, and the changing of constructor up to the final completion by BECHTEL was 18 months altogether. To appreciate the work accomplished by BECHTEL, one only has to measure such delay against delays accumulated in other projects, for causes less serious than those seen in LNG1. For example, the liquefaction plant at Skikda (the first three lines) which is twice less important than LNG1, the construction of which was started in 1969 by TECHNIP but did not reach full capacity production until 1975[73].

The collaboration with American capital and firms[74], which increased greatly in the 1970's decade led some people to claim that Algeria was just changing one capitalist country by another. However, according to Boumediene if Europe was capable to equal the US, the

situation would possibly have taken a different way from what it is. Also if for sometimes Algeria collaborates with US firms in different fields, it is simply because the American firms have shown superior initiative, efficiency and competence to that of European enterprises.

"In some economic and political spheres, some strive here and there, to make it a belief that with her gas, Algeria is filling her soul with American capitalism and so believing that they could influence us by attempting to denature us in the eyes of others. The operation is evidently nothing but a commercial transaction in the full and strict sense of the term [....]. Algeria as every one knows would not sell her soul to anyone, embarks on this transaction with full awareness of her interests, knowing clearly what she gives as well as what she receives in return" [75].

Before analysing the positive and negative effects of SONATRACH-EL-PASO contract, one has to bear in mind the fundamental differences between the gas and petroleum markets. While the petroleum market is based on a wide network, constituted of hundreds of ports, thousands of ships, and the manipulation of petroleum products, it allows international transaction to be conducted at a short term notice. In reverse, the natural gas market requires the existence of specific installations for each transaction (pipelines, liquefaction plants, storage rooms, LNG carriers, methane ports and regasification centres). Moreover, the liquefaction plants and LNG carriers require an important investment which can only be amortized

in many years. Thus, both the seller and buyer of natural gas may not find it easy to change their partnership as in the oil market. Contracts for gas transaction are often between 12 and 25 years, such length when added to specialized installations makes the contracting parties less and less free, as compared with petroleum contracts.

In order to determine the merits of the contract we need to analyze its commercial, financial and technological effects on the gas industry and the national economy.

Commercially, the SONATRACH-EL PASO contract allowed Algeria to widen the market for the Algerian gas from 14 billion m³ to 80 billion m³. From 1975 to 1978 SONATRACH signed a total of 13 contracts, the basic price of these contracts was \$1.30 per million B.t.u.

From the financial point of view, both the liquefaction plant and the contract SONATRACH-EL PASO were short of a disaster. The final cost of LNG1 was \$2400 million or four times what was originally planned[76]. The price introduced in the contract was very low, \$0,305 per million British thermal unit B.t.u., as a result of which Algeria is estimated to have lost \$290 million[77].

The negotiators of SONATRACH have accepted concession clauses in favour of the client EL-PASO, in other terms, the price of Algerian gas was connected to the internal movement of internal prices in the United States. Unfortunately, such vision did neither correspond to

the general orientations of that time, nor to the need to balance the balance of payments. This attitude was considered by the Planning Ministry in 1980 as deliberately autonomous, less thoughtful to the rest of the economy and from which all errors were trickled:

"From this deliberately autonomous attitude, which is little concerned with the rest of the economy, from which all mistakes were trickled, where the coefficient of liquefaction capital, the long delays in maturation and concessions on prices and guarantees are only few aspects among the many that are costly to the economy in the same way as are the foreign debts or the widespread disequilibrium"[78].

The relatively punctual economic and financial situation of Algeria during 1969 does not explain the rationality behind the acceptance of disadvantageous contractual conditions for a very long period of 25 years. However, the low prices[79] might have been used to attract financial and American technologies, and at the same time to escape the blockage over the Algerian gas. In other terms, the contractual concessions were the political price paid by Algeria, especially when one knows that there was no diplomatic relations between Algeria and US at that time.

If such political price can be advanced as a justification in 1969, one may wonder why no negotiation of the contract's price took place until January 1979? Certainly the conditions had changed as early as 1974, when the oil prices increased. In 1979, the price of

the contract was \$0.37 in real terms^[80], and comes to \$3.43 per million B.t.u. in the US after transport and regasification, while the Mexican gas was priced at \$4.47 per m. b.t.u. at the frontier and the Canadian gas \$4.5 m b.t.u. when pipeline cost for internal distribution is added, the implied advantages to EL-PASO from the Algerian LNG is more confirmed^[81].

In January 1979, SONATRACH asked for a revision of the contract's price. However the increase of oil price from \$14.80 a barrel in the first term of 1979, to \$30 later^[82] in the year, and the change in the international energy market made the earlier revision not sufficient. In October 1979, EL-PASO was notified by SONATRACH of its displeasure with the terms of the renegotiated contract which put the price at \$1.95 per million b.t.u. or more than five times of the original price. The new price was adopted by the Energy Department's Economic Regulatory Administration on December 29, 1979. On March 6, 1980, the Algerian Government rejected the new price and asked for the price of LNG to be equivalent to the price of crude oil. Furthermore, such parity between oil and gas needs to be realized at Arzew and not at the point of use in US. In practice, this means \$6 per million B.t.u.'s which was unacceptable to the Americans, since in their view it would effect both the Canadian and Mexican deals. The Assistant Secretary Leslie J. Godman, who was the Engergy Department's Chief bargainer argued that parity at the well-head is "completely off the map"^[83], and "with shipping and storage, \$6 gas in Algeria would be \$7 or so in the East, and I can state categorically that LNG at \$7 delivered is not going to fly"^[84].

To justify the Algerian Government's position, Belkacem Nabi, advanced the following arguments. First, Algeria did not want to be treated less important than any other supplier, and that the US had admitted the correlation between oil and gas^[85], in their gas deals with Mexico and Canada. It is worth noting that while the US Energy Department was resisting the parity deal for LNG imports from Algeria, Phillips Petroleum and Marathon oil had been exporting 140 million cubic feet a day from Alaska to Japan since 1969, the price of which was directly linked to the price of crude oil and was close to what the Algerians were demanding^[86]. Second, a higher price for LNG is justified by the huge investment undertaken by Algeria in gas liquefaction facilities and by the security of supplies for the client, assured by the long duration of the contract^[87]. A Sonatrach official professed astonishment at the US insistence on cheap gas "It is as if an eccentric farmer were to claim that because he wishes to feed cavier to his chicken, the price of that cavier should be the same as that of corn"^[88].

Sonatrach set 31st March 1980 as a deadline for El-Paso to meet its terms. When the deadline was reached, without an agreement gas supplies were cut off at El-Paso's request^[89]. The request to cut-off might have been used by El-Paso to put pressure on Algeria to settle the price^[90]. EL PASO was banking on the fact that the shut-down of LNG1 Arzew would amount to a loss of \$3 million per day for SONATRACH^[91]. Furthermore, because of the nature of the natural gas market, it would have been quite difficult to find an alternative client to take a 10 billion m³ of LNG a year. Even if such a client was to be found, no country at that time had terminal facilities to handle the 125,000 m³ LNG carriers except Japan (Montoire-de-Bretagne terminal of France was not ready at that stage).

The American negotiators appear to have underestimated the determination of the new team at the head of Sonatrach led by the Energy and Petrochemicals Minister M. BELKACEM NABI and fully backed by the new government of CHADLI BEN-DJEDID. Algeria was prepared to keep its gas in the ground until an acceptable price agreement was reached not only with EL-PASO but also with Gaz de France and ENI of Italy.

In the case of Gaz de France, gas was not cut off but continued on the basis of a price of \$4.45 per million B.T.U.'s from July 1980 until a final agreement was reached. After more than two years of negotiations Algeria succeeded in getting the highest current F.O.B. netback price achieved by any producer[92]. The deal with France clearly represents a compromise by the both sides. Although SONATRACH did not achieve full parity for gas with its light Saharan crude oil, it has set the stage for the resumption of LNG sales after successive falls in 1980 and 1981 because of the cut-off to EL-PASO. The Gas Agreement of February 3, 1982, put the price of Algerian LNG at \$5.10 per million B.t.u.'s at Algerian ports. Such price contributed significantly to Algeria bargaining position with ENI of ITALY.

The supply of Algerian natural gas to Italy, through the Hassi R'Mel SICILY pipeline could have started as early as October 1981. However, a disagreement over the revision of gas prices between SONATRACH and ENI delayed the operation. The conflict concerned the contract for the supply of 12 billion m³ of pipeline gas which was signed in October 22, 1977. The contract stipulated a basic price of \$1 per million b.t.u's. During the renegotiations it became evident

that the major striking point was the price difference calculated by the two companies.

SONATRACH's view was that it intended to sell its gas to its customers without discrimination. Therefore, it was fair to ask ENI to pay at Sicily an equivalent to what Gaz de France pays for LNG imports after transport and regasification. For example, if we consider that the F.o.b. price for Gaz de France at Arzew or Skikda is \$5.10 per million b.t.u., plus \$0.70 per m b.t.u. as the cost of transport and regasification, the price comes to \$5.80 per m b.t.u. The transport cost from Hassi R'Mel to Sicily will be between \$1.30 to \$1.40. Thus the price which ENI should pay will be between \$4.40 and \$4.50 per m b.t.u.

PRICE CALCULATION		
<u>SONATRACH</u>	<u>per million b.t.u.</u>	<u>ENI per million b.t.u.</u>
F.O.B. price (GAZ DE FRANCE)	\$5.10	\$5.10 FOB PRICE FOR GDF
Transport and re-gasification	\$0.70	\$1.35 liquefaction cost
Pipeline transport to Sicily	\$1.30 (or \$1.40)	\$0.20 pipeline transport to liquefaction
	-	\$0.20 plants pipeline
FOB price for ENI should be	\$4.40-\$4.50	\$3.75 to Tunisian frontier.

The Italian view was that ENI should not be required to pay what Gaz de France pays after regasification, but the well head price. In

other terms, to deduct \$1.35 the cost of liquefaction and the pipeline transport cost from Hassi R'Mel to either Arzew or Skikda \$0.20 from the FOB price of \$5.10, to come to a \$3.55 at Hassi R'Mel to the Tunisian frontier. ENI insisted that it should only pay a FOB price of \$3.75 per million b.t.u. and not the \$4.40 or \$4.50 asked for by SONATRACH.

To counter balance the Algerian-French deal, the Italians advanced their own deal with the Soviet Union with an agreed price of \$4.70 per million b.t.u., and suggested a similar deal with the Algerians. Another argument was the fact that investment in pipeline gas is considerably less than gas liquefaction projects, and that this differential should be reflected in price.

Algeria remained unmoved from its original position and insisted that the price it was asking was reasonable and thaty it was neither asking for charity nor gifts but only exercising its legitimate rights.

"We have required reasonable prices, similar to those demanded in other regions. We have asked neither for charity nor gift, but only required our rights"[93].

Like the French deal, the negotiations between SONATRACH and ENI reached a stage where the intervention of both the Algerian and Italian Governments was required. In February 24, 1983, the double negotiations[94] which took almost a year, succeeded in reaching an agreement. Under such agreement, the FOB price for natural gas is

believed to have been settled at \$4.41 per million b.t.u. In return it was agreed that Algeria would open the door to \$1.5 billion of Italian export[95].

It is conceivable that the failure of SONATRACH-EL PASO negotiations and the financial penalties caused by the stopping might have led Algeria to pull out altogether of LNG. Such possibility was raised by the price agreement with Italy and the proposed second pipeline to Spain, already on the drawing board. The cancellation of the VALHYD plan, and the fact that 20% of gas is being lost in the liquefaction process makes the future of LNG in Algeria very doubtful.

Also, at the technological level, the case of gas liquefaction appears to have no bright side in the context of Algeria. The characteristic of gas liquefaction have obliged the country to import the totality of processes, equipment and technical services from few MNCs who specialised in this branch of industry. The risk involved is that the industry may become totally dependent, on what can rightly be called the Americanization of the gas industry. The power of economic integration of this type of development is practically nil, since the technology is imported (equipments, machineries, process and patents), the skilled personnel to construct and exploit those installations is foreign. The lack of domestic technical capabilities reduce the controlling power of the State.

Moreover, the high level of investment combined with the methods of realization of industrial projects - turnkey - condemned any real

possibility of a progressive mastery of the imported technologies. Such situation can only strengthen technological dependence on multinationals, by calling upon them to provide technical services (i.e. maintenance, experts, spare parts etc.). It is the extent to which the liquefaction of gas relies on technical assistance which makes it inappropriate for Algeria or any other developing country with similar underdevelopment status.

If we take the case of the LNG1 plant at Arzew we find that the plant employed 1600 workers in 1980 out of which 500 were foreign technical assistance^[95], working under the supposition of functioning the plant and facilitating the transfer of technology. The director of Arzew's industrial zone estimated that for each expert provided to the Algerian hydrocarbon sector, multinationals gained between \$15,000 and \$20,000 excluding wages^[97]. In other terms, technical assistance services are used by the technology suppliers as an additional source of income, and as such, instead of preparing the way for its own disappearance by training the Algerian personnel, it does all it can to prevent such eventuality.

Technical assistance, as it functions in LNG1 plant, controls almost everything. The two key departments of the plant: production and maintenance are exclusively reserved for it. It is true that the director and vice-director of the plant are Algerians. However, technical assistance is also represented at this high level in the form of the "Plant Manager" who is the counterpart of the vice director. Only the departments of personnel and general services (transport, canteen, and cooperative) are Algerianized.

The massive recourse to foreign technical assistance "FTA" during the 1970's decade was often justified by the accelerated expansion of the hydrocarbon sector in particular, industrial development in general, and by the difficulties of mastering very new and sophisticated techniques in a short term[98].

The argument for the justification of FTA is essentially based on two interlocked elements: advanced technologies and the lack of indigenous technical capacities. In other terms, for Algeria to develop its potential gas reserves, advanced technologies are needed to be imported. To establish and run these technologies, technical services of the technology suppliers were a necessity which the country could not have done without, since qualified national personnel was not available.

Bearing in mind the lack of any real industrial experience, the reality which we can depart from is that the technological choice operated at the production level, might have made the imported technologies almost uncontrollable. Thus, these two elements might have contributed significantly in increasing the number of FTA. But, other factors might have also contributed as much if not more.

First, the concentration of the planning and execution on industrial development in the hands of few bureaucrats may have led to the misuse of funds and abuse of power for personal gains. For example, one cannot explain what the maintenance of a spare parts stock and even worse, sweeping floors have anything to do with

advanced technologies. Both jobs were in early 1980's occupied by foreign technical assistance, at LNGI Arzew[99]. Or, how come that the same study (economic and technical) was requested six times in the space of six years, three times of which were from the same foreign engineering company. It is significant to note that the price paid for the first request was 550,000 dinars (about \$125,000) and jumped to 111,117,000 dinars[100] (about 25,253,863) or an increase of 202 folds in the space of six years. The secrecy which surrounded industrial development might have allowed such abuses to go on unchecked[101]. These examples and others makes it hard to believe that they were the result of an accelerated development or even ignorance. On the contrary, they appear to suggest that they were the result of a deliberate policy to transfer public money abroad for personal benefit by certain bureaucrats[102]. These personal gains may also explain the hostility shown by some of the hierarchies to the method "plant in production", under which FTA[103] is an integrated part of the contract. Further, they appeared to favour the method "turnkey", under which, part of FTA (i.e. management, training, functioning of industrial units) are provided under separate contracts. The distinction between the two forms is that the latter provides more room for manoeuvres and for abuses to take place.

Second, the lack of national policy for the consumption of foreign technical assistance. Like most developing countries, the recourse to FTA should serve as a means of increasing the technical capacities of the recipient countries in specific techniques not yet locally available or fully mastered. In Algeria, despite the policy embodied in the National Charter "La Charte Nationale" of 1976 , FTA continued to be unregulated:

"The call for technical assistance must be made within the scope of a national policy which is carried out in close correlation with the needs of the national personnel [....] Cooperation with foreign countries must be called for, channeled and used with strict respect to the country's options. It must lie within the framework of a policy that maintains the balance of exchange and safeguards the partners mutual interests"[104].

In practice, however, no global rules governing FTA were ever defined or established. Often, it was the necessity to respond urgently to the increasing demand to solve production problems, which dictated the situation. The increasing demand for FTA, might have been itself one of the factors which have limited the possibilities for establishing such rules. There has never been an Algerian policy with regards to the recourse to technical assistance services nor have there ever been any defined objectives[105], or any procedures adopted.

In the absence of a rational policy, the objectives of FTA were not clearly articulated the one to the other. The activities and durations of FTA have never been, neither investigated nor scrutinized prior to 1979.

In the previous chapter, we have seen that national enterprises have in principle the power to choose autonomously the techniques and technologies. Due to the lack of industrial experience and the

shortage of national competences such decentralization can only be described as excessive, since in practice it meant the delegation of those powers to foreign engineering firms. It was an illusion on the part of Algeria to rely solely on the services of foreign engineering firms, since those firms were in many cases no more than a vehicle of investment transfer and promoters for the sale of equipments. Thus, engineering firms may have been formally or informally bound to special suppliers, and intentionally favour techniques which rely heavily on the services of FTA. Moreover despite the absence of common rules of conduct or guidelines, national enterprises were entrusted with the task of negotiating and concluding FTA contracts. As a result, FTA services were multiplied, adding to the existing over cost of industrial projects. One can safely say that FTA instead of creating the proper conditions for its own disappearance, it created the need for more recourse to it.

In the context of Algeria, three types of foreign technical assistance can be distinguished. First, tied or integrated technical assistance. By integrated assistance, we mean assistance which responds to the followign observations (i) the uniqueness of the source of techical assistance. In the sense, the contractual relationship is limited to two contracting parties, even if the furnisher sub-contracts a part of the services. There is no separation of equipment, technology and technical assistance services, they are both included in the same package. (ii) The uniqueness of the legal instrument in the sense that integrated technical assistance exclude the intervention of a proper legal instrument, it is formally translated in the global contract. As a result, the guarantees

provided by the suppliers cover all the operations included in the contract. The singleness of the legal instrument make the integrated assistance correspond exactly to the "plant in production" method of contracts where the essential characteristics are related to the fact that the client requires two main things: a turnkey plant corresponding to well defined criteria; and a transfer of technology with the necessary training for running the realized plant in a defined time, the products corresponding to standards and quantity established in the contract. Finally, integrated technical assistance is exclusively connected with "plant in production" contracts, and thus, so far in practice, limited to Algeria[106].

Foreign technical assistance included in turnkey contracts can either be classified as tied assistance, in the sense that it constitutes an essential part of the same contract, or as a specified assistance since it relates to the supply of equipments and their setting up in a functioning order. The task of the constructing foreign firm mainly concerns the conception of the construction and the starting up operation. Around these tasks a number of technical assistance services are articulated. For example, the starting up of industrial production which is a very advanced stage of the execution of the contracts and precedes the final delivery of the plant to the client is conducted under the constructor's own personnel and the client's personnel[107].

Second; specified technical assistance which is connected to the contractual form "separate contracts" and in most cases linked to engineering contracts. The engineering firm's assistance allows the

client to operate his choice among the different offers of equipments and techniques and often include:

- comparative studies of the gathered offers and propose the choice of offer to be retained.
- detailed statement of the retained offer^[108], and assist the client firm in the attribution of transactions.
- provide a list of the project materials and contractual documents (i.e. patents, know-how).

The contracts for the supply of equipments and other services are concluded directly between the client and other firms and outside the intervention of the engineering firms. However, the real intervention has in fact occurred during the selection of techniques and equipments^[109], since it is the suggestions and proposals of the engineering firm which are translated by the client enterprise into contractual obligations.

Third; autonomous technical assistance. The autonomy of this type of assistance is the result of the fact that the contracting parties are not contractually related to each other in any other commercial operation, concerning the plant for which the technical assistance is destined. Therefore, the exclusive subject of the contractual relationship is the required assistance. This form of assistance can be advantageous to national enterprises, in the sense that it allows for a direct choice of the supplier. As we have seen, in "turnkey" and "plant in production" contracts, the constructors are not necessarily the owners of the provided services. More often than

not, the foreign parties to these type of contracts conclude agreements with the real owners of processes, patents and engineering methods. Thus, autonomous assistance excludes the intervention of the intermediary firm between the lessor and the recipient. It is in the interest of NES to negotiate directly with smaller firms, rather than large multinational corporations. On the other hand it may be disadvantageous in terms of guarantees, since under "turnkey" and "plant in production" contracts the assistance formulates a part of the contract obligations. As such, and in particular under "plant in production" contracts, the penalties are higher.

Technical assistance, when integrated, tends to be subordinated to the fundamental obligations of the constructor, to an extent that it is considered as a secondary act in the sense that it ceases to exist when the other obligations are fulfilled. Under the autonomous form it loses such secondary status to become fundamental. The difference in status is translated in practice by the duration of FTA, which is generally long, between 4 and 6 years. However, it is not easy to give precise duration for integrated assistance.

Both specified and autonomous FTA can be called pure technical assistance and may also include management and direct intervention of foreign experts (i.e. for repairs and maintenance).

Available statistics show that between 1973-1978, a total of 4912 contracts for technology transfer were concluded between national enterprises and foreign firms at a cost of 103.5 billion dinars

(around \$24.5 billion). Such figure is not far from constituting a record expenditure among developing countries, especially with regards to foreign technical assistance, which shared 55.4% or 57.4 billion dinars of the total expenditure[110].

As far as the diversification of technology supplies is concerned, it is not perhaps surprising to find that the supply of technical assistance services tend to follow the same pattern as that of technology imports[111].

Based on the combined expenditures on pure and integrated FTA (Annex 6:6), and the number of contracts during the six years period, it is possible to conclude:

(1) The massive recourse to FTA is an indicator of the extent of Algeria's technological dependence and at the same time disguises the national handicap in the realization of industrial projects and the management of the constructed units. If we look at the expansion of the gas sector[112], it appears that the Algerians may have been led to believe that industrial development can be bought and that development consisted of grafting industrial complexes,utilizing peak technologies which Algeria is not capable of managing. However, the reality of a genuine economic and social development csn only be the fruit of domestic efforts and above all must lean on internal capacities. Innovation, adaptation and technical progress remain the keys to sustained increase of individual productivity and thus to social changes at all levels.

The Algerian industrial development has and still being realized under the incorporation of technical processes conceived and produced

in the capitalist countries. Therefore, it is a "derived" method of development in the sense that it is fundamentally based on the assimilation of technologies which are not a direct result of internal mechanism of capital accumulation.

In order to break away from the classical dependencies (financial, commercial and cultural) which characterizes developing countries, Algeria had firstly to adhere to a new kind of dependence, technological dependence. Algeria's technological dependency consists of two interlocked elements: first, pure and simple importation of machineries and equipments; second, the intervention of foreign firms through the supply of technical services, under the contractual forms turnkey, plant in production, and engineering contracts. The systematical utilization of advanced technologies cannot be seen as anything else other than increased dependence. The lack of domestic capacity to assimilate adapt and develop the imported technological know-how means that technological dependence is no longer transitional or temporary but rather a long term problem.

The rhythm of industrial investments which has often been blamed for the lack of domestic assimilation and adaptation of imported technologies should be brought into line with the availability of national skilled manpower. Such manpower must necessarily be trained to conceive, realize and utilize the tools of production, if FTA services and thus technological dependence are to be partly reduced. The more the country relies on FTA, the further technological and economical independence becomes an illusion. So far the recourse to FTA has only served to strengthen rather than lessen economical and technological dependence.

(2) The absence of a national policy and an institutional framework, to coordinate and regulate the consumption of foreign technologies and technical assistance appears to have had a significant impact on the multiplication of the cost of the industrial projects. In return the high cost indicates that the benefits derived from FTA services were in fact minimum when set against its cost. The prevailing situation amounted to a "laissez-faire; laissez-aller", which in practice meant that the state control over such imports was almost non-existent. The effects of the absence of such a policy were summarized by the Planning Ministry in 1980 as follows"-

".... the absence of an institutional framework has resulted in the multiplication of external technical assistance services which were similar or even identical and sold to each of the different Algerian buyers. It is not uncommon to find one Algerian buyer purchasing the same services from different suppliers [.....]. Finally it is not exceptional to find foreign engineering firms "bureaux d'etudes" intervening to provide services which have already been supplied by their predecessors"[113].

(3) Unlike other developing countries such as India and Latin American countries, where the regulation of technology transfer is at quite an advanced stage, regulations concerning such transfer are non-existent in the case of Algeria. Technology import are not being regulated in the sense that there is no compulsory evaluation or registration of technology transfer contracts. The fact that no mention of restrictive clauses was included in the case of Algeria

does not necessarily mean the country's bargaining position was so strong as to exclude their application. It simply means that no precise view can be advanced about restrictive clauses or to the extent of their application, since the contracts for the transfer of technology are one of the most secretly guarded documents.

4. The resort to foreign technical assistance is supposed to substitute for the qualitative and quantitative inefficiency of local technical capacities. However, the examination of the contents of FTA showed that its field of operation was so flexible that in many cases it was possible to incorporate local competences. The exclusion of local capacities by the proponent of FTA lended those competences in administrative tasks. Even more, the phenomenon rapidly took the form of a vicious circle, whereby nationals were trained by FTA (in Algeria or abroad) but once they become qualified, they were not given the job which they were trained for. After a short period, they either emigrated or were hired by foreign firms to work in other developing countries or even in their own headquarters. In either case, the country stands to lose. It is an accepted fact that, the local competences were rarely allowed to integrate in the development experience or to serve it[114].

Foreign technical assistance has strong interest in restricting the integration of local competences into the development experience. FTA often tends to extend the duration of training, or block the granting of tenure to Algerians, so that their own duration is extended. An American who was sitting in the privy for granint tenure to Algerian trainees at INGI was quoted to have said:

"If the incumbent is an Algerian, it would mean that an American will take the plane back home"[115].

In other terms, if an Algerian becomes qualified, it is an expatriate who takes the plane. Generally, it is often the more qualified personnel, or those who are near the end of their training who break off with the system. Those who leave are replaced by young trainees requiring more training and thus extending the duration of FTA.

(5) Finally, as far as the access to foreign technologies is concerned, the Algerian experience appears to have been successful. The concept of the "industrializing industries", necessitated the investment in a technical base compatible with those prevailing in the world market. Thus, the productive combination of the Algerian industrial sector tend to identify with those dominant abroad, mainly in the capitalist countries. In the privileged industrial branches, steel; petrochemicals; electrical and mechanical construction industries only the most advanced technological processes were acquired. In the case of gas liquefaction, Algeria even played the role of a guinea pig for processes conceived in Europe and US (LNG Skikda). Thus, and in so far as the mere physical acquisition of foreign technologies, the policy can claim to have been successful.

However, the physical transfer of technology cannot in my view constitute a solid base for genuine and continuous development. In the beginning of the 1970's decade, the Algerian were persuaded to believe that the building of industrial units provides the quickest,

most dependable and disciplined way of acquiring know-how, industrial experience and inventiveness by Algerian workers. The concept of "learning by doing" was theoretically designed to bring workers face to face with the problems bound-up with the acquisition of technology, in order to make them aware of the mastery they stand to win in all spheres. The policy also implied that industrial process in itself generates experience, and each operation is reflected in the acquisition of certain amounts of technological capital. As a result, the access cost of technology acquisition will be cut with each successive operation. We must bear in mind that the technological capital which Algeria stood to accumulate was not limited to recent technologies, nor to purely technological inputs. It embraced production; innovation; products design, and management. In fact, it included every day to day economic activities, since every activity called for efficiency even if it did not involve industrial secrecy or protection, or high level of scientific knowledge.

In practice, the theory of "learning by doing" suffered from a number of limitations in the case of Algeria. First, the nature of imported technologies (advanced and capital intensive) meant that only a relatively small number of workers could benefit from the application of this theory. Second, the insufficient methods of project realization, lack of domestic means, collaboration with foreign firms and above all the policy of turnkey plants have not led to the hoped result. Both contractual forms "turnkey" and "plant in production" meant that national enterprises have acted as a mere spectators during the construction phase, and thus excluding any chance of applying the learning by doing concept. The same exclusion

can be found at the level of production - though to a less extent - especially in those plants constructed under turnkey contracts (i.e. gas and petrochemical branches). Third, the rhythm of investment in industrial projects, the weaknesses of planning, in terms of creating big and large enterprises, resulted in a weak degree of specialization among national enterprises and reduced any real opportunity of mastering the imported technologies.

Finally, excessive centralization in the structure of decision making. In theory it is recognised that a centralized structure of decision making may lead to optimum economic results, providing that an effective administrative machinery exists. The less effective the administrative machinery the more dangerous and excessive centralization become. If such machinery cannot fulfil its tasks, it becomes a structure which can lead to erroneous decisions and delays in the intervention of the guardian authority at the level of enterprises.

Such is the situation in Algeria, where the inefficiency of information is quite apparent at the level of central authorities as well as national enterprises. Describing the administrative potential of Algeria, J. R. NELLIS wrote in 1980:

"In an increasingly regulated, increasingly supervised and increasingly inefficient world, the Algerian bureaucracy maintains its standing as one of the most difficult with which to deal and one of the least productive in terms of output"[116].

Under such conditions, excessive centralization of the structure of decision making, coupled with unregulated and undesirable excessive decentralization with regards to the choice of technical processes by national enterprises, erroneous decisions may have been allowed to take place. By undesirable, I mean, the weak negotiating position of most national enterprises (lack of administrative personnel, information about alternative technical processes) which led to a total relying on foreign engineering companies and thus to negative economic results. The impact of the inefficient and centralized administrative machinery of Algeria might have helped to create a category of an economical bureaucracy with interests different from those of the national economy. Such bureaucratic category may have acted as an obstacle against the embodied concept of "learning by doing", by opting for more foreign technical services, despite the availability of local competences and therefore excluding those competences from furthering their technical knowledge.

The concept of "learning by doing" was made totally unworkable, in the industrial sectors which relied on advanced technologies. Algeria did not only use prototype technologies, but was also used as a training ground for foreign companies own manpower. This question is particularly highlighted in the gas liquefaction industry, where it is widely believed by the trade union of INGL ARZEW that 9 out of 10 technical assistance who work at the plant are in fact handymen hired to further their own technical knowledge in specific fields. Regardless of whether the ratio of 9 to 1 might be exaggerated, or even reversed, the fact remains that less developed technologies were bought, where the supplier's own personnel had not mastered the "being-developed technique". By buying such technologies which the supplier knew in advance that Algeria could not operate due to the newness of the technology, the supplier made sure it did not allow for the intervention of any foreign personnel other than his own. Thus, the supplier's own personnel is sent to help national enterprises in

the good running of plants. But implicitly the foreign personnel is there to detect any weaknesses in the newly introduced technology and to report back whatever modifications or readjustments may be necessary. In such a case, it can be said that Algeria was not only paying foreign technical assistance to further their training at the expense of excluding national competences, but also contributing indirectly to R & D expenditure of the technology suppliers, without receiving anything in return.

NOTES: CHAPTER SIX

1. The technology for liquefying gas dates back nearly 200 years. M. Van Marum and A. P. TROOSTWIJK of Netherlands were probably the first to liquefy air under laboratory conditions as long ago as 1787. The first patent liquefaction was granted to Godfery Cabot of Boston in 1917, to liquefy gas under a combination of pressure and cooling. 1917 had also seen the first scale of natural gas liquefaction by the United States Bureau of mines. The objective was to separate Helium from natural gas in order to use the former as a lifting agent in airships. Liquefied natural gas was first transported in an experiment between US and UK in a joint effort between the British Gas Council and Constock Liquid Methane Corporation. The first trial left Lake Charles in the US on 28 January 1959 with a full cargo and reached Caney Island on 20th February 1959. For further details on liquefied gas and its sea transportation see MALCOM W. H. Peebles (1980) "The Evolution of the gas industry" MACMILLAN PRESS LTD., Chapter 7 ppl85-210.
2. With a proven reserves of 2,974 billion cubic meters, a probable reserves of 520 billion cubic meters and possible reserves of 299 billion cubic meters, Algeria is believed to be the fourth largest in the world, and with 1,023 million metric tones of crude oil occupies the fourteenth place. These reserves were made at Algeria's request by the US firm of De Golyer and MacNaughton: Report of the oil, gas, condensate and

LPG Reserves of Algeria, August 1, 1977. To get such reserves to the consumers market, the gas has to be liquefied. However, in 1981 the first trans-Mediterranean pipeline connecting Hassi R'Mel gas field in Algeria to Sicily in Italy and passing through Tunisia was completed.

3. See National Westminster Bank (1982) "ALGERIA" An Economic Report December 1982.
4. For further details on Algeria's hydrocarbon conservation policy see: The World Bank (1982) "Algeria: The Five-Year Development Plan and the Medium Term Prospects for 1980-84" June 25, Volume I pp78-82 and Volume II pp63-76; LLOYDS BANK Group Economic Report (1982) "Algeria" pp7-9, IMF (1980) "Algeria continuing rapid growth, charts for bigger development effort".
5. As cited by ZIANE BRAHIM (1980) "GNL-ARZEW" ALGERIE-ACTUALITE NQ 765 (12-18 June) p.8.
6. The standard liquefaction technique is referred to as the CASCADE process which involves successive cooling of natural gas by three different refrigerants (propane, ethylene and methane) while passing through three different heat exchanger, to a temperature of minus 161°C. See EDWARD FARIDANY "LNG MARINE operation and market prospects for liquefied natural gas 1972- 1990" The Economist Intelligence Special Unit - Special

Number 12 p60; MALCOM W. H. PEEBLE (1980) op cit p206.

7. In 1961 the CAMEL was jointly owned by CONCH international Methane Limited of UK 50 percent, and two French firms SNREPAL and CFPA shared the other 50%. After the independence, Algeria acquired 20% of the shares, leaving the English and French interests with 40 per cent each. After the 1971 nationalisations, SONATRACH'S share increased to 48.8%, leaving CONCH with 40%, SOCALDEX 2.4%, Le Methane liquide 5.6%; COFIDAL 1.6%; and SDRS 1.1%. In 1975, all French interest in CAMEL were taken over by SONATRACH which increased its share to 60%. Finally, on May 10, 1977, the remaining 40% of CONCH were acquired by SONATRACH. See MALCOLM W. H. PEEBLE (1980) op cit ppl90-194; Rabah Mahiout (1974) "Le Petrole Algerien" Editions EN.A.P Alger pl83; The Middle East and North Africa (1978-1979) p218, Revolution Africaine No 412, March 2, 1972 and no 839, March 21, 1980 p22.
8. Malcolm Peeble (1980) op cit pl92.
9. Abdelkader Sid-Ahmed (1980) "L'OPEP Passe, Present et Prospective" O.P.U. ALGER p343; Middle East Economic Digest (MEED) (1978) "ALGERIA" (Special Feature) p7; The World Bank (1982) Vol. II op cit p67.
10. See Annex 6:3.

11. In 1968, the Societe Mixte Algerienne du Gaz (SOMALGAZ) was founded with the participation of SONATRACH 50% and ERAP (France) 50%. On February 3, 1971, SOMALGAZ, the holding company for the Skikda liquefaction plant, signed a contract with Gaz de France (GDF), for the supply of 3,7 billion cubic metres of LNG a year, from Skikda (Algeria) to Fos sur mer (France) for 25 years starting from 1972. Later in 1971, and after an agreement between SONATRACH and ERAP, SOMALGAS became 100% owned by SONATRACH. See Rabah Mahiout (1974) "Le petrole Algerien" Editions En.A.P. ALGER p190; SONATRACH (1972) "La politique petroliere de l'Algerie: Events, Etudes, Declarations" Volume I p259, and Volume IV pp597-599; EL-DJEICH No 142 "L'Usine de Liquefaction de Skikda" Mars 1975 pp21-24; Revolution Africaine (1980) "Le Gaz: Une industrie d'integration" no 839 (du 21-27 Mars 1980) p23.
12. Unlike the classical "cascade" process which involves three refrigerants, the "teal" process involves only one refrigerant consisting of nitrogen and hydrocarbon materials derived from the incoming gas (the gas entering the liquefaction units consist of propane; methane; and methylene) and works under two levels of compressures: medium compression for the mixte refrigerant, and a low compression, where the actual liquefaction of gas takes place.
13. The first line for the production of LNG went into service in the summer of 1972, the second line in July 1973, and the third

in September 1973.

14. Dimitri Germidis (1976) op cit ppl07-108.
15. PH. LABARDE, Le Moude PARIS, 28 Mai 1974, pl4.
16. From 1973 to 1978, the anticipated 80% capacity was only reached once in 1976.
17. MEED 21/12/1973.
18. MEED 22/2/1974.
19. MEED 22/3/1974.
20. PH. LABARD (1974) op cit pl4.
21. The Fourth LNG Congress, sponsored by three international organizations L'Institut International du Froid; L'Union internationale de l'Industrie du Gaz, and the Institute of Gas Technology; held its 4th meeting in Algiers from 24 to 27 June 1974 and was attended by some 1500 engineers, economists, experts, of which 600 were from the US and 300 from France. See MEED 5/7/1974, and El-Moudjahid 28/6/1974.
22. See below, the Trans-Mediterranean gas pipeline and Gas prices.
23. Abdelkrim Abib (1976) "L'accès à la technologie; Le cas Algérie" Juns-Druck, Ver Lag Zurich p66.

24. Revolution Africaine no 839 op cit p23.
25. The Plan de Valorisation des Hydrocarbures known as the VALHYD PLAN.
26. See Chapter 4 above - the industrialising industries - and Annex 7:4.
27. See Chapter 5 above - (projects evolution and contracts procedures).
28. See, Ministere de la Planification (1980) "SYNTHESE DU BILAN Economique et Social de la Deconnie (1967-1978)". Mai 1980 pp304-351. The 1980-84 development plan proposes a reorganisation of the industrial sector. Among the specific tasks allocated to industry during the plan's duration are: (a) to facilitate internal financing of development, by improving industrial efficiency and increasing production; (b) to improve industrial design and execution capabilities so that projects can be completed rapidly (see the number of non finished projects at the end of 1979, Chapter Five Annex 5:9); (c) to focus the major parts of the industrial sector derive to increasing production, on supporting in those sectors previously ignored (housing, water development, agriculture and economic infrastructure) (Annex 6:4) and to respond to the rapidly increasing demand; and (d) to foster a better distribution of economic activities throughout the national

territory by developing medium and small industries. MINISTERE DE LA PLANNIFICATION ET DE L'AMENAGEMENT DU TERRITOIRE (1980) "PROJECT DE PLAN QUINQUENNAL 1980-1984" Orientations Generales des Developpement ppl-59.

29. Compare actual planned cost both in percentage and monetary values during the First 4-YEAR PLAN and 2nd 4-YEAR PLAN in Annex 6:4.
30. Ongoing or carry-over project share almost half of 1980-84 investment 196,7 billion dinars (49.10%). The carry over to the plan is particularly high in non-hydrocarbon sectors, but not less significant in the hydrocarbons. At the end of 1979, there was 34 projects uncompleted and requiring an investment of 28.4 billion.
31. BECHTEL (1977) "The Hydrocarbon Development Plan of ALGERIA: Financial Projections 1976-2005" CALIFORNIA.
32. Other objections include (i) the treatment at viable economic conditions of associated and non-associated gas for the recovery of condensate and LPG (essential for butane and propane); (ii) reinjection of gas and notably of associated gas to allow for a better recovery of oil reserves; (iii) To optimise the recovery of condensate by cycling either totally or partially deposits of condensate gas; and (iv) A systematical recovery of LPG at the level of gas treatment

units, on the field, at the level of liquefaction plants, and of course at the level of refineries. See CHAKIB KHELIL and Abdallah Harouka (1979) "Plan Global de developpement des Hydrocarbure on Algerie" EL-HINDISS No 3 January February 1979 p38 (published by the Algerian union of Engineers).

33. Ibid p39.
34. Ibid tables 2; 3; 4 pp39-41; MEED (1978) "ALGERIA" Special feature p9.
35. See Annex 6:5 for details.
36. A trade Unionist from the Arzew's ammonia plant during the 1980 debate of what became known as "la bataille du gaz" cited in: ARZEW: les lecons de l'experience" ALGERIE Actualite No 792 (18-24 Decembre 1980) p8.
37. Ministere de la Plannification (1980) "Bilan de Synthese" op cit pl36.
38. According to M. Mekideche (Director of the Arzew industrial zone), the plant cost was \$2.5 billion. M. Mekideche (1980) "le secteur des hydrocarbures. Quelle contribution au developpement Economique et Social de l'Algeris?" TIERS MONDE No 83 (Special feature Algeria) p511; and Annex 6:3.

39. See Douglas Evans (1978) "Western Energy policy: The case for competition" MacMillan Press ppl56-159.
40. Ministere de la Planufication (1980) "Project de Plan Quinquennal 1980-1984" op cit p409; The New York Times, June 11, 1980.
41. Other large industrial projects, not yet committed, have been deferred beyond 1980-84 Plan, including the shipyard project, integrated vehicle manufacture and heavy petrochemical projects. The cancellation of projects was based on two facts: (i) projects where the committments are important, such projects dictate their continuation; (ii) projects where the committments are not important, their realisation may be re-examined, and cancelled or left to other coming plans. The cancellation together with the revision of relatively minor importance represent a saving of about 17 billion dinars or 20% of carry-over cost in the hydrocarbon and non-hydrocarbon industries: See: Ministere de la Planification (1980) "Project de Plan Quinquennal" op cit pp408-410; World Bank 1982, Volume 2, op cit p79.
42. In order to convey crude oil, natural gas and condensate to the processing and refining centres at Arzew, Algiers, Skikda and Bejaia an extensive pipeline network has been constructed. All the network is 100% owned by SONATRACH.

43. "Transmed Gas: Overcoming underwater drawbacks" ARABIA: THE ISLAMIC WORLD REVIEW No 3 November 1981 pp71-72.
44. Revolution Africaine "LE GAZ: Une Industrie d'Integration" No 839 (21-27 Mars 1980) pp23-24.
45. Ibid p23.
46. Negotiations are taking place between SONATRACH and FERNGAS (Austria) and Yugoslavia for possible supply of gas through the pipeline (see Annex 6:2).
47. The proposal which SNAMPROGETTI submitted to Greece contain the following:
 - the adding of one 6 inch diameter sealine to the existing three lines;
 - the laying of 200 miles pipeline between Brindisi in Southern Italy and Corfu in Greece; and
 - the laying of 300 miles network of pipeline in Greece for local distribution.

The three phases will cost about \$2000 million, of which \$900 million for the first two and \$1,100 million for the last. The agreement has yet to be finalised. See MEED of

(7/8/1980); (14/3/1980), and (2/5/80).

48. SEGAMO is a joint venture and the shares are divided as follows: SONATRACH 50%; ENGAS (Spain) 25%; and GAZ DE FRANCE 25%.
49. PETROLE: STATISTIQUE DE L'Industries Petrolieres (1978).
50. Up to February 24, 1971, the French oil companies held 70% of gas reserves, 68.9% of Petroleum and condensate, and 40% in transportation. After the nationalisation of February 24, 1971, only 22.7% in petroleum remained. For further details on the situation between Algeria and the French oil companies see SONATRACH (1972) "La politique petroliere de l'Algerie" op cit Vol 1: L'Algerie et le marche Francaises ppl36-156.
51. See above p4 and Annex 6:2.
52. ENI has proposed to Algeria the construction of a refinery at Arzew. The proposal was rejected, since ENI asked for a guaranteed of no less than 12% remuneration for its capital, a capital participation of no less than 50 per cent, and 50 per cent participation in local market and distribution. If one adds all the benefits from the construction and the supply of equipments to the refinery, it is hard to imagine any loss to ENI. See Hamid Mazri (1975) "Las Hydrocarbures dans l'economie Algerienne" SNED ALGER ppl80-81; El Moudjahid 14.3.1967;

Revolution Africaine "L'Algerie future principal de gas dans le monde" No 423 (6/4/1972).

53. For the role of ENI and Esso in the Algerian gas see SONTRACH (1972) "La politique petroliere de L'Algerie" Vol. 1 op cit ppl07-132.
54. Ibid pl28.
55. See the attitude of the World Bank towards financing public sector in Algeria in Chapter 5 (Mixte Enterprises, Ammonia plant).
56. Prior to 1969, and under the old regime ESSO controlled important petroleum deposits in Libya.
57. At that time, the Soviet Union was importing Iranian gas through a pipeline and exporting such gas to Europe, thus it became an intermediary dealer for the sale of Iranian gas to Europe. To reduce the impact on the Algerian-Soviet relations, the Vice Minister of the Soviet government M. FEDEROV was sent to Algeria. He is believed to have suggested to the Algerian authorities that the Algerian gas has a big future in Europe, and implicitly implying that in any event the Soviet gas should pass before the Algerian. See Hamid Mazri (1975) op cit ppl79-190. The same attitude was taken by the Soviets in 1981 when they were urged by Algeria to seek parity with oil prices

for the Siberian gas, but the asking price by the Russians has undermined Algeria's position which was at that time negotiating gas prices with France. See THE ECONOMIST "Algerian Gas Undercut by the Russians" December 5, 1981 p81.

58. See SONATRACH (1972) "la politique petroliere de l'Algerie" Vol. 4 op cit p403-4; El-Moudjahid (27/4/1971).
59. The Agreement-Accord PETROLIERE ALGERO-FRANCAIS-signed in 29 July 1965 calls for a 50% management association "gerants d'Associations" to each of Algeria and France. The Agreement is 200 pages long comprising 53 articles and 12 Annexes. In its preamble it calls for:
 - "determination d'un champ d'activite propre a la cooperation de l'Etat Algerien et de l'Etat francais dans les domaines des hydrocarbures, compte tenue de volonte de la Republique Algerienne d'orienter sa politique du petrole et du gaz selon des formulas variees;
 - Volonte de l'Algerie de developper son industrialisation (notament grace a l'exploitation des soruces du gaz) et de government Francais d'apporter son concours a cette industriailsation".

For further details on 1965 Agreement see SONTRACH (1972) Vol. 1 op cit pp2-15.

60. After the 24/2/1971, SONTRACH's share became 100% for gas, condensate and pipeline, and at least 51% share in all French oil companies, allowing it to control 77% of petroleum production.
61. HAWARD BOYD declaration to Wall Street Journal as a Chairman of EL-PASO, quoted by El Moudjahid 4/5/1971.
62. The French Petroleum Company CFP had a 49% share in Hassi R'MEL gas field prior to nationalisation. The gas field has a proven reserve of 2000 billion m³, and from which gas will be supplied to EL-PASO after its liquefaction at Arzew.

The Federal Power Commission received a telegram dated 3/5/1971 from M. VICTOR DE METZ Chairman of CFP, expressing his objections to CONSOLIDATED GAS SUPPLY form importing LNG from Algeria.

63. The State Department said that "it placed major importance on the expansion of economic relations with developing countries including Algeria" FPC News Vol. 4 no 25 p2. The Americans also confirmed that a meeting between M. Pompidou the French President, and M. Walson, the US Ambassador to France, took place in early APRIL and where "M. Pompidou aurait demande aux Americain de ne pas encourager l'intransigeance des Algeriens". See le Monde 15 April 1971.

64. ALEXANDER STEWART (1980) "EL-PASO in the Grip of the frozen fuel" FORTUNE July 14 p72.
65. FPC News op cit p2.
66. FPC News Vol. 5 no 21, May 26, 1972 p4.
67. For further details see FPC News: NEWS RELEASES: No 17583 (June 14, 1971); 18273 (May 22, 1972); 18306 (June 7, 1972), and 19019 (February 23, 1973) concerning the debate by the FPC of Distrigas Corporation, Colombia LNG Corporation, et. al; cases for the importation of Algerian LNG.
68. A. DJERAD (1979) "Non-Alignement ou dependance: Le Cas Algerien" memoire pour la DEA. Universite De Droit Economique et science sociale, Paris Annex 1 table II.
69. The American firms which participated in the supply of equipments and construction of LNGl plants at Arzew include the following:
 - Constructor: CHEMICAL Construction
Incorporation "CHEMICO", later
replaced by BETCHTEL
 - liquefaction process: Air Product

- Boiler: Construction Engineering
- Big Turbines: General Electric
- Comrpessor: ELLIOT Cy
- LNG Heat Exchanger: Air Product and CHEMICO
- Heat Exchanger: Bernard and Buck; Struthers
Walles; Hunt Tools
- Surface Condenser: Graham Manufacturing.

As well as, other equipments from the following firms: Continental EMSCO; Envirogenics Systems; Allis-Chalmers; Aires Cryogenics, Worthington; Jamesbury Corporation, and CF Guyon Gulf Supply. The contract for the management was also awarded to the American Group UOP. See DIMITRI GERMIDIS (1976) "Le Maghreb, la France et l'enjeu technologique" CUJAS, PARIS pl05.

- 70. A. DJERAD (1979) op cit Annex I table 2.
- 71. ALEXANDER S. (1980) op cit p73; THE NEW-YORK TIMES, NOVEMBER 10, 1975 p50.
- 72. F. YACHIR op cit p681.

73. Effective start-up was delayed 2 years in the case of SONACOME at constantine and Guelma; and 3 years in the case of SONETEX at TIERT. However, one should not forget that the delay in the case of LNG 1 was relatively short but the cost increased almost fivefold. See MALIKA ABDELAZIZ in ALGERIE-ACTUALITE No 765 (12-18 June 1980) p7.
74. For the realisation of SONATRACH-EL PASO contract, the following loans were granted to SONATRACH: Exim Bank (US) \$157 million; US Banks (the First National City Bank, Bank of America, First National Bank of Chicago) \$157 million, First Boston Company CHEMICAL BANK \$250 million; European Bank \$42.5 million guaranteed by Exim bank; Marine US: \$52 million for 3 LNG carriers; and the financing HassiR'MEL-Arzew gas pipeline by General Electric. See A DJERARD (1979) op cit, MEED (1978) "ALGERIA" (Special feature) op cit pl2.
75. PRESIDENT BOUMEDIENE. INAUGURATION speech of the first production line of GNL 1 at Arzew, February 21, 1978.
76. The figure of \$2400 million was advanced by the Minister of Energy and Petrochemical Industry M. BELKACEM NABI to the National Assembly. MIDDLE EAST ECONOMIC SURVEY No 1 January 7, 1980, p6. The figure of \$2500 million was also advanced as the final cost by the director of Arzew's industrial zone M. MEKIDECHE (1980) "le secteur des Hydrocarbures" op cit p511.

77. MEE SURVEY, June 12, 1978 p2.
78. The Anaysis of the Algerian economy between 1967-1978 was conducted by the new team of the planning Ministry and Other Ministries who contested the economic choices of the previous regime. See Ministere De la Plannification (1980) "SYNTHESE DU BILAN" op cit p72.
79. The price of gas under the SONATRACH-EL PASO contract was \$0,305 per million B.T.U., which is lower than the price charged to Gaz de France \$0,40 million B.T.U. in 1964, and 0.15 cents lower than that of the same Algerian gas to Distrigas and Trunkline (both US firms).
80. PAUL BALTA, CLAUDINE RULLEAU (1981) "L'ALGERIE DES ALGERIENS: VINGT ANS APRES" PARIS pl31.
81. MINISTERE DE LA PLANIFICATION (1980) "SYNTHESE DU BILAN" op cit pp72-73.
82. The World Bank, Vol. 2 op cit p71.
83. As cited by ALEXANDER STEWART: "EL-PASO comes in from the cold" FORTUNE March 23, 1981 p56. However, and in the interest of getting the project running again Algeria was willing to consider setting aside the goal of parity. Thus as a result, the asking price dropped to \$3.50 in early 1980. However,

Goldman refused the deal. The same policy was employed in the SONATRACH-GAZ DE FRANCE Contract, the latter was billed \$6 per million B.T.U. but in fact paid only \$4.20 until July 1981 and then \$4.45, until a final agreement was reached in February 1982 between the two governments setting the price at about \$5.10 at Algerian ports.

84. As cited by ALEXANDER STEWART: Fortune (1980) op cit p74.
85. BELKACEM NABI, The Algerian Minister of Energy and Petrochemical Industry as qutoed by Paul Balta, Claudine Rulleau (1981) op cit pl32.
86. Alexander Stewart (1980) Fortune op cit p73 and 75.
87. For further details see the following articles in Revolution Africaine: January 1-7, 1982:- G. Boutaleb "La promotion du gaz et la bataille de prix" pp24-28; M. GHELLAL "La commercialisation du GNL et l'adaptation des contracts aux circonstances nouvelles" pp46-49.
88. Maurad Beldjoudi, SONATRACH's director of gas export in a speech on April 1980, cited by ALEXANDER STEWART, FORTUNE (1980) op cit, p74.
89. "C'est a la demande de la campagne Americaine (EL-PASO) que les livraisons du gas ont ete inter-rompus" declare BELKACEM

NABI Revolution Africaine 1-7 Janvier 1982 p38.

90. The Chairman of EL-PASO, TRAVIS PETTY, predicted that the rhetoris will soon die down, and SONATRACH will settle after the fourth session, which was to be held on June 25 and 26, 1980.
91. The shut down of LNG 1 ARZEW may represented a missed chance by SONATRACH to earn \$3 million per day, or \$2 million as estimated by others, but certainly not a loss since the gas will remain in the gas field. Only the running cost will be lost by SONATRACH.
92. The price paid to Algeria by the Agreement of February 3, 1982 was superior to world market. It is in fact a political rather than commercial and was the result of M. METTERAND's visit to ALGERIA at the end of November 1981. The main provisions of the Agreement were:
 - (a) the revision of the price of the two contracts signed in 1964 and 1972 totalling 4 million m³
 - (b) to put into force immediately a third contract of 5.1 billion m³ per year (the three contracts were linked in a single contract of 9.1 billion m³ per year)
 - (c) to put into function the terminal at montoire-de-Bretagne, which has an annual capacity of 10 billion m³ LNG. The terminal will receive 5.1 billion m³ for Gaz de France as

well as 2 billion m³ destined for Belgium and which will be transmitted through France.

(d) The price of Algerian gas sold to France will be indexed to petrol and superior to world market price. Gaz de France will pay 86.5% and 13.5 by the French Government.

(e) to pay Algeria 6 billion Francs (about £572 million) to make up for the difference between the price paid by Gaz de France and that billed by SONATRACH since 1980.

In return, the deal is linked to a deal worth 12.5 billion Francs for orders by Algeria from French companies which include: 500,000 Renault lorries, railway equipment, the construction of Algiers underground and 50,000 houses per year. See JEAN GLOAGUEN "UN PRIX POLITIQUE" EXPRESS, PARIS, (12-2-1981) p38; Revolution Africaine "Algerie-France: La Relance?" (27 Nov-Dec 3, 1981) pp23-38; Le Monde, Paris, September 17, 1981 p41, and February 22, 1982 p42.

93. The President CHADLI BENDJEDID's speech during a visit to BATNA (East Midlands of Algeria) February 26, 1981.
94. From April 15, 1982, negotiations were conducted at two levels: Ministerial level between Nabi (Algeria) and Capria (Italy) with occasional intervention by the two foreign affairs ministers, and at companies level between SONATRACH and ENI.
95. El-Moudjahid February 26, 1983 pl and 4; The Financial Times, February 21, 1983 p2.

96. Ziane Brahim (1980) "les travailleurs du gaz a Arzew" ALGERIE - Achialite No 764 (5-11 June) p8; 'GNL ARZEW" No 765 (12-18 June 1980) p8. However SONATRACH's own statistics shows that only 948 were employed (see Annex 6:3). Whatever the real figure may be, trade union leaders confirmed that the number of Foreign Technical assistance at LNG-1 is almost 500, mostly Americans.
97. M. MEKIDECHE (1980) "Le Secteur des hydrocarbures" op cit p112. No figure can be advanced for the wages, except that it is possible that they are higher than the 31000 to 47500 dinars paid as monthly wages to foreign experts from capitalist countries at EL-HADJAR STEEL works near Annaba.
98. Industrial and energy sectors, shared 96% of the expenditure on FTA between 1973-1978.
99. ZIANE BRAHIM (1980) ALGERIE-ACTUALITE No 765 op cit p8.
100. MALIKA ABDELAZIZ (1980) "Quelques Verites" ALGERIE-ACTUALITE No 765 op cit p7.
101. These are only a few of the examples which were allowed to surface under the new Government which took power in February 1979.
102. It was mentioned in Chapter Five that the former vice chairman

of SONATRACH Ait LAOUSSINE has managed to set up a consultant company in GENEVA (Chapter 5 note 15). The connection between his former job and the present one may not be difficult to reach. Furthermore, several former Ministers and Civil Servants of the Boumediene regime are under investigation for corruption and misuse of public funds and it is more likely that many of them will face trials. The list includes the former Foreign Minister Abdel Aziz Boutaflika for 12 years up to 1979, Belaid Abdelslam former energy minister, Ahmed Ghazali former Director-General of Sonatrach. All were expelled from polit-buro and the central Committee of the FLN.

103. There is no precise definition of the content of technical assistance, however it may include the following services: construction of industrial plants; repairs, maintenance, engineering, training; know-how and show-how and studies of general character.
104. Republique Algerienne Democratique et Populaire (1976) "La Charte Nationale" Ordonance n^o 76-57 du 5 Juillet 1976, Section (vii) "la cooperation avec l'etranger".
105. Except the above mentioned policy in the National Charteed *ibid*.
106. For further details see "plant in production" contracts in Chapter Five above.

107. The tasks of the contracting foreign firm may also include the selection and the recruiting of national personnel, the establishment of the training programme and the training of such personnel in its own plants. For further details see Chapter Five "turnkey contracts".
108. In practice and in the case of Algeria the criteria under which engineering firms select offers is never supplied to the client, which further shows the implicit ties between foreign firms (suppliers of equipments and technologies) and engineering firms, and the reduction of the role of the latter to a simple salesman for the former.
109. For detailed technical assistance included in the different forms of contracts see Annex 5:10 in Chapter 5.
110. See Annex 5:6 for details and Annex 6:6.
111. See Annexes 5:11 and 6:6 where for example, during 1973-78, 92% in capitalist countries. For technical, scientific and cultural cooperation between socialist countries and Algeria see A. DJERARD (1979) op cit; ZELACI CHAMS EDDINE (1980) "les relations de l'Algerie avec les pays socialistes d'Europe" Memoire pour la DEA de politique internationale, PARIS 1.
112. See both Annexes 6:1 and 6:7.

113. Ministere de la Planification (1980) "Synthese du Bilan" op cit p310.
114. Ibid p314. The present Five Year Development Plan 1980-84, also admits that not only the services of FTA were multiplied but also touched fields where real local competences have existed. See Ministere de la Planification (1980) "Projet de Plain Quinquennal 1980-84" p566.
115. As reported by the trade union at LNG 1 plant Arzew, cited by Ziane Brahim (1980) op cit ALGERIE-ACTUALITE No 765 p8.
116. J. R. NELLIS (1980) "Maladministration, cause or result of underdevelopment: the Algerian Example" Revue Canadienne des Etudes Africaine, (Mars 1980) pp410-411; and "Socialist Management in Algeria" Journal of Modern African Studies, April, 1977.

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ANNEX 6:1

ALGERIA'S GAS LIQUEFACTION PLANTS UP TO DECEMBER 31, 1982

AREA	PLANT	PRODUCT- TION LINES	INSTALLED ANNUAL OUTPUT CAPACITY	FOREIGN FIRM (CONSTRUCTOR)	LIQUEFAC- TION PROCESS	INITIAL COST (in millions of dinars(a))	TYPE OF CONTRACT	STATUS
ARZEW	CAMEL(b)	4	1.8 bil. m ³ (c) RHODES (UK)	TECHNIP (F) / PRITCHARD	CASCADE	401	Mixte Enterprise	Operating
	LNG 1	6	10,5 bil. m ³	BECHTEL (US)	APCI-MCR	1400	Turnkey	Operating
	LNG 2	6	10.5 bil. m ³	PULLMAN KELLOG (US)	APCI-MCR	2700	Turnkey	Under Construction
	LNG 3	9	15.5 bil. m ³	FOSTER WHEELER		3500	Turnkey	CANCELLED(d)
SKIKDA	Lines 1, 2, & 3	3	4.5 bil. m ³	TECHNIP	TEAL	803	Turnkey	Operating
	Line 4	1	1.4 bil. m ³	PRITCHARD RHODES	PRICO	267	Turnkey	Operating
	Lines 5 & 6	2	3.1 bil. m ³	PRITCHARD RHODES	APCI-MCR	808	Turnkey	Operating

(a) The cost shown above represents the initial cost, but the actual cost in some cases is 4 times higher.

(b) CAMEL (Compagnie Algérienne de Méthane Liquide), became 100% owned by SONATRACH in 1977, renamed GL4Z.

(c) The Construction of the plant was first awarded to CHEMICAL CONSTRUCTION CORPORATION (USA) IN 1971, and withdrawn in 1975.

(d) Plans were also abandoned for the construction fo LNG4 of ISSER near Algiers and LNG II SKIKDA.

SOURCE:-

- A. DJERAD (1979 "Non-Alignment ou Dependence: Le Cas Algérien" Memoire pour le DEA, PARIS, Université de droit économique sciences sociales. ANNEX I table I);
- MIDDLE EAST ECONOMIC DIGEST (MEED) (1978) "ALGERIA" Special Feature November 1978 p7;
- MALCOLM H. W. PEEBLE (1980) "Evolution of the GAS INDUSTRY" Macmillan Press Ltd., p202;
- Abdelkader Sid-Ahmed (1980) "L'OPEP, PASSE, PRESENT, ET PROSPECTIVES" O.P.U. ALGER p343;
- OMANG, JOANNE (1978) "NEW INDUSTRY IS BORN AS FIRST LNG TANKER ARRIVES AT COVE POINT" WASHINGTON POST, MARCH 14, 1978 p3. As well as Revolution Africaine and Algerie Actualite (different numbers).

SONATRACH: LNG AND NATURAL GAS EXPORT CONTRACTS

BUYER	DESTINATION COUNTRY	QUANTITY (Billion cubic metres per year)	PLANNED DELIVERY DATE	TERM OF CONTRACT	STATUS
British Gas Council	UK/Canvey Island	1.11 billion m ³	1964	15	Operational
GAZ DE FRANCE	FRANCE/Le Havre	0.56 billion m ³	1965	25	Operational
GAZ DE FRANCE	FRANCE/FOS	3.70 billion m ³	1973	25	Operational
DISTRIGAS	US/EVERETT - Boston	1.90 billion m ³	1978	20	Operational
ENAGAS	Spain/Barcelona	4.76 billion m ³	1980	23	Operational
EL-PASO I	US/Cove Point	10.95 billion m ³	1978	25	Operational(1)
Sub-total of operational sales		22.98 billion m ³			
DISTRIGAS	Belgium/Zeebrugge	5.29 billion m ³	1980	20	Contract signed and approved
GAZ DE FRANCE	FRANCE/MONTOIRE	5.45 billion m ³	1980	20	" " " "
TRUNKLINE	US/LAKE CHARLES	4.76 billion m ³	1981	20	" " " "
THYSSENGAS/Brigitta	WEST GERMANY	4.23 billion m ³	1984	20	" " " "
RUHRGAS/SALZGITTER	WEST GERMANY	11.90 billion m ³	1983	20	" " " "
FERNGAS/GASUNIE	NETHERLANDS				
ENI (2)	ITALY (Gas pipeline)	12.00 billion m ³	1982	20	" " " "
TUNISIA (2)	TUNISIA (Gas pipeline)	1.20 billion m ³	1982	20	" " " "
Sub-total of approved sales		45.90 billion m ³			
TOTAL OF Operational and approved sales		68.88 billion m ³			
EL-PASO II	US/MATAGORDA BAY	10.90 billion m ³	1982	20	Contract signed and waits approval (1)
TENNECO	US/ST JOHN	10.60 billion m ³	1981	20	" " " "
	Canada/Brunswick				
SWEDEGAS	SWEDEN	1.70 billion m ³	1985	20	" " " "
FERNGAS (3)	Austria	2.00 billion m ³	1982	-	Under negotiation
YUGOSLAVIA (3)	YUGOSLAVIA	2.00 billion m ³	-	-	" " " "
GAZ DE FRANCE (4)	FRANCE	10.00 billion m ³	-	-	" " " "

(1) Contract abandoned in 1980.

(2) Natural gas through Hassi-R'MEL/TUNISIA/SICILY pipeline

(3) Natural gas through Hassi-R'MEL/TUNISIA/ITALY pipeline

(4) Possibly through Algeria - Spain pipeline

ANNEX 6:3

ACTUAL AND FUTURE EMPLOYMENT IN THE GAS LIQUEFACTION PLANTS

PRODUCTION UNITS	ACTUAL EMPLOYMENT AT THE END OF 1980				ADDITIONAL REQUIREMENTS			
	Executives(a)	Supervisors(b)	Production(c)	TOTAL	Executives	Supervisors	Production	TOTAL
GL 4 Z(1)	36	133	305	474	7	54	28	89
GL 1 Z(2)	56	281	611	948	21	102	95	218
GL 2 Z(3)	62	92	59	213	-	9	605	614(5)
GL 1 K(4)	51	113	785	949	4	12	90	106
TOTAL	205	619	1760	2584	32	177	818	1027

(a) Including managerial staff.

(b) Including technicians

(c) Production staff including temporary employment (workers and qualified agents)

(1) The new Code used by SONATRACH, Fomrer CAMEL.

(2) The new Code used by SONATRACH, Fomrer LNG 1 Arzew.

(3) The new Code used by SONATRACH, Fomrer LNG 2 Arzew.

(4) The new Code used by SONATRACH, include the 6 liquefaction Lines at SKIKDA.

(5) The high additional required number for GL2Z, is due to the fact that the plant is still under construction.

SOURCE: SONATRACH, Department of personnel.

INVESTMENT PROGRAMS BY SECTOR
1970 - 1984 (In Millions of Dinars)

DEVELOPMENT PLANS	FIRST 4-YEAR PLAN 1970-1973		SECOND 4-YEAR PLAN 1974-1977		INTER-PLAN BUDGET PLANS		FIRST 5-YEAR PLAN 1980-1984		
	PLANNED INVESTMENT	ACTUAL COST	PLANNED INVESTMENT	ACTUAL COST	1978	1979	CARRY(a) OVER	NEW(b) PROGRAMS	TOTAL
Economic Sectors									
HYDROCARBONS	4570 (17.12)	16000 (23.34)	19500 (17.69)	63530 (24.41)	34400 (35.60)	20100 (31.06)	28400 (14.44)	34600 (16.97)	63000 (15.73)
NON-HYDROCARBON INDUSTRIES	7830 (28.22)	20500 (29.91)	28500 (25.86)	103160 (33.14)	21250 (21.99)	15440 (23.86)	50400 (25.62)	41100 (20.16)	91500 (22.84)
Agriculture and Fisheries	3040 (10.95)	5850 (8.53)	12120 (11.00)	17000 (5.46)	2000 (2.07)	3295 (5.09)	6900 (3.51)	17200 (8.44)	24100 (5.98)
Water Development	1900 (6.85)	3640 (5.31)	4600 (4.17)	14600 (4.69)	1770 (1.83)	2129 (3.29)	10800 (5.49)	12200 (5.98)	23000 (5.70)
TOURISM	700 (2.52)	1690 (2.46)	1500 (1.36)	3020 (0.97)	310 (0.32)	330 (0.51)	1700 (0.86)	1700 (0.83)	3400 (0.83)
TRANSPORTATION	800 (2.88)	1370 (2.00)	6490 (5.84)	10229 (3.28)	2680 (2.77)	1861 (2.88)	2800 (1.42)	10200 (5.00)	13000 (3.21)
Economic Infrastructure	1510 (5.44)	3420 (4.99)	6300 (5.72)	18610 (5.98)	5580 (5.77)	3576 (5.53)	19900 (10.12)	18000 (8.83)	37900 (9.48)
Construction	- -	850 (1.24)	2730 (2.48)	6040 (1.94)	2350 (2.43)	3941 (6.09)	3400 (1.73)	16600 (8.14)	20000 (4.94)
Housing	1520 (5.48)	3610 (5.26)	8300 (7.53)	34620 (11.12)	14180 (14.67)	6539 (10.11)	34800 (17.69)	25500 (12.51)	60000 (15.10)
Education & Training	3310 (11.93)	6760 (9.86)	9950 (9.03)	23760 (7.63)	8140 (8.42)	3760 (5.81)	30200 (15.35)	12000 (5.89)	42200 (10.62)
Social & Administration Infrastructure	2570 (9.26)	4870 (7.10)	10230 (9.28)	16720 (5.37)	3970 (4.11)	3774 (5.83)	7400 (3.76)	15100 (7.41)	22500 (5.59)
TOTAL	27750	68580	110220	311300	96630	64705	196700	203900	400600

ANNEX 6:4 (Continued)

- The figures in parentheses show the percentage
- Hydrocarbons include: Oil and gas (exploration, production, marketing, distribution, Gas liquefaction and LPG production)
- Industry includes: mining; energy; petrochemicals; steel; mechanical and electrical industries; construction materials; food industries; other manufacturing industries, and regional industries.
- Agriculture includes: Agricultural production; livestock development; Equipments; Studies for rural development, Forestry and Fisheries
- Water Development: dams, irrigation, urban and industrial water supply.
- Transportation: Road Transport; Rail transport, sea transport and Air transport.
- Economic Infrastructure: Highways, Railways, ports and Airports; Telecommunication, distributions, industrial Estates.
- Housing: Urban and rural.
- Education and training: Education, vocational training, Higher education.
- Social and Administrative infrastructure: Health, administrative infrastructure and others.

- (a) Carry-over which is 49.1% of the total planned investment concern projects under previous plans.
- (b) New programs include investment to be carried out in existing production units, known as IVPEs: "Investment de valorisation du potentiel existant" (Investments for Developing existing potential).

SOURCE: Ministère de la Planification et de l'Amenagement du Territoire (1980) "SYNTHESE DU BILAN ECONOMIC & SOCIAL de la Decennie 1967-1978" Mai (1980)

(1980) "PROJET DE PLAN QUINQUENNAL (1980-84) MAI (1980)
(1974) "Report General: 2^{eme} PLAN QUADRIENNAL (1974-197) MAI (1974)
(1970) "Report General: 1^{ere} PLAN QUADRIENNAL (1970-1973) MAI (1970)

Assemblée Nationale Populaire (1980) "Report General: Plan Quinquennal (1980-84) Volume: 1, 2, 3 and 4.

CHRISTIAN PALLOIX (1980) "Industrialisation et Financement Lors des deux Plans Quadriennaux" Revue TIERS MONDE pp531-555.

INFLOW AND OUTFLOW OF CASH IN ALGERIA:
VALHYD PLAN (APRIL 1978)
(in billions of US dollars)

	1978	1979	1980	1981	1982	TOTAL
INFLOW OF CURRENCIES						
SALES IN CURRENCIES (a)	5,34	6,19	7,41	9,62	10,33	38,94
EXTERNAL BORROWING	3,19	3,25	2,89	1,54	1,12	11,99
DIRECT PAYMENT OF ASSOCIATED COMPANIES	1,33	1,31	1,24	1,21	1,20	6,29
TOTAL OF INFLOW	9,86	10,75	11,54	12,37	12,65	57,17
OUTFLOW OF CURRENCIES						
COST OF EXTERNAL EXPLOITATION	0,18	0,20	0,25	0,36	0,43	1,42
COST OF EXTERNAL FINANCE	0,12	0,13	0,48	0,60	0,70	2,03
COST OF EXTERNAL INVESTMENT(b)	3,19	3,25	2,89	1,54	1,12	11,99
REPAYMENT OF EXTERNAL DEBTS	0,12	0,19	0,88	1,24	1,62	4,05
TOTAL OF OUTFLOW	3,61	3,77	4,50	3,74	3,87	19,49
NET INFLOW	6,25	6,98	7,04	8,63	8,78	37,68

SOURCE: CHAKIB KHELIL, Abdallah Harouaka (1979) "Plan global de développement des hydrocarbures en Algérie" EL-HINDISS NO. 3 (January-February 1979) p43. Table 4.

- (a) Sales revenues are based on the 1976 price for oil (Hassi Messaoud was \$13.10 while it reached \$40 in 1980 F.O.B.) and on the ING's 1977 price of \$1.325 per million British thermal units (Btus), while the price rose to \$5.10 million m³ in February 1982 in the Algerian French Gas agreement.
- (b) Concern the buying of equipment, services, licences, etc.

ANNEX 6:6

THE COST OF PURE AND TIED FOREIGN TECHNICAL ASSISTANCE IN ALGERIA BETWEEN 1973-1978 (in millions of Algerian dinars)

YEAR	A		B			Number of contracts (6)
	Cost of Pure Technical Assistance	Cost of tied technical Assistance (1)	Total of A and B	Percentage of B in relation to the global cost of contracts (2)		
1973	1000 (4)	1023.9	2023.9	28.18%	511	
1974	2700 (4)	2747.5	5447.5	30.62%	689	
1975	4700 (4)	4672.7	9372.7	32.29%	891	
1976	5000 (4)	5083.2	10083.2	30.09%	939	
1977	6600 (4)	6609.7	12029.7	45.13%	936	
1978	8600 (4)	8684.3	17284.3	38.92	946	
TOTAL	28600 (5)	28821.3	57421.3	34.71% (3)	4912	

SOURCE: Ministere de la Planification (1980) "SYNTHESE DU BILAN" op. cit p307 and Annex IV-24 p315.

- (1) Technical assistance as part of the transfer tied either to turnkey or plant in production contracts.
- (2) The percentage is calculated in relation to the global cost of contracts shown in Annex 5:6 of Chapter 5.
- (3) Represents the average cost of foreign technical assistance in the cost of contracts.
- (4) For detailed cost of separate services of FTA see Annex 5:6.
- (5) The share of the first four countries, all capitalist was as follows: France 20%; US 17%; West Germany 13.9%; and Italy 11.7% or 63.2%. Seven more Western countries shared 29.10%: Japan 7.7%; Canada 5.2%; Belgium 4.7%; UK 4.7%; SWITZERLAND, NETHERLANDS 2.1%; and Spain 1.6%. The share of the socialist countries was 3.9%; and developing countries 3.80%.
- (6) All types of contracts of technology transfer.

CONTRACTS FOR THE ESTABLISHMENT OF THE ALGERIAN GAS INDUSTRY (1967-1977)*

YEAR	SUBJECT MATTER OF THE CONTRACT	FOREIGN PARTNER(a)	TYPE OF CONTRACT	INITIAL COST (in millions of dinars)
1967	<ul style="list-style-type: none"> - Gas pipeline: Hassi-R'MEL/SKIKDA - Gas pipeline: Hassi-R'MEL/SKIKDA 	SOFERGAZ (France) Vallourec and Pont a Mousson (France) (40%) SIDEREXPOT (Italy) (30%) C. ITOH and NIPPON KOKAN (Japan) (30%)	ENGINEERING Supply of 190,000 ton of pipelines	32 94
1968	<ul style="list-style-type: none"> - Gas pipeline: Hassi-R'MEL/SKIKDA 	SNAM PROGETTI ITALY	Construction	267
1970	<ul style="list-style-type: none"> - Gas and condensate separation unit at ARZEW (4,000,000 ton/year) - LPG Storage Unit at Skikda (500,000 ton/year) - 2 LPG plants (900,000 T) - Gas Compression station at Hassi-R'Mel - Gas pipeline: Hassi-R'Mel/ARZEW II(b) - LPG and Condensate pipeline Hassi MESSAOUD/Hassi-R'Mel 	CJB Wilbros (U.K.) ISHIKAWAJIMA (Japan) FLOUR (U.K.) TUNZINI-Ameliorair (France) O.P.T. (France) ALEIP (60% Sonatrach; 40% O.P.T.) SNS (Algeria) SAIPEM (ENI subsidiary) (Italy) SOFERGAZ (France) WILBROS (U.K.)	TURNKEY TURNKEY TURNKEY TURNKEY SURVEY STUDIES Mixte Enterprise Supply of pipes Construction Supervision Construction	113 53 80 89 2.2 17 223 10 196

CONTRACTS FOR THE ESTABLISHMENT OF THE ALGERIAN GAS INDUSTRY (1967-1977)*

YEAR	SUBJECT MATTER OF THE CONTRACT	FOREIGN PARTNER(a)	TYPE OF CONTRACT	INITIAL COST (in millions of dinars)
1970	Gas pipeline: Hassi-R'Mel/Sicily	BECHTEL (U.S.)	Consultant work(c)	N.A.
1971	- Gas pipeline Hassi-R'Mel/Spain - Completion of a gas compression station at Hassi R'Mel	William Brothers Engineering (U.S.) PRITCHARD (U.K.)	Feasibility study(d) TURNKEY	N.A. 44
1972	- Gas pipeline Hassi R'Mel/Arzew construction and supply of two compression stations	CJB (U.K.)	TURNKEY	160
1973	- Gas pipeline: Hassi-R'Mel/Arzew 5 compression stations	General Electric (U.S.)	TURNKEY	276
1974	- Gas pipeline: Cassi-Touil/Hassi-Messaoud - Gas pipeline: Hassi R'Mel/SIKIDA 3 compression gas stations - Third Gas pipeline: Hassi-R'Mel/Arzew Engineering & Supervision of work Construction - Gas pipeline: Hassi R'Mel/Qued Isser	SOFERGAZ (France) WILBROS (U.K.) ALEIP (Sonatrach and OPT) ALCIP (Sonatrach 51%; Saipem 49%) OPT (France)	Engineering TURNKEY Mixte Enterprise Mixte Enterprise Feasibility Studies	N.A. 312 8.9 133 N.A.

CONTRACTS FOR THE ESTABLISHMENT OF THE ALGERIAN GAS INDUSTRY (1967-1977)*

YEAR	SUBJECT MATTER OF THE CONTRACT	FOREIGN PARTNER(a)	TYPE OF CONTRACT	INITIAL COST (in millions of dinars)
1975	- Gas pipeline: Gassi-touil/Hassi-MESSAOUD	ALCIP (Algerie-Italy)	Mixte Enterprise(e)	133
	- Gas pipeline: Algeria-Europe through Spain	SOFERGAZ (France)	Contract signed with the Mixte Enterprise SEGAMO	44
	- 4 units for the treatment of natural gas at Gassi-Touil	SOFERGAZ (France)	TURNKEY	89
	- Plant for the production of non associated gas and LPG at Hassi-R'Mel	PRITCHARD INTERNATIONAL Corporation (U.S.)	TURNKEY	680
1976	- Unit for the treatment of natural gas at Hassi-R'Mel	Japan Gasoline C. ITOH (Japan)	TURNKEY	1900
1977	- 2 construction of 2 injection units for natural gas at Hassi-R'Mel	NUOVO PIGNONE (subsidiary of ENI)	TURNKEY	950

SOURCE: SONATRACH

*Excluding Liquefaction plants (see Annex 7:1)

- (a) The term foreign partner means, in most cases, Multinationals which the Algerian hierarchy excluded from their language. Its content was designed to mean "commercial interest groups, nor more no less".
- (b) The first gas pipeline from Hassi-R'Mel to Arzew was constructed in 1961 by SOTHPA (subsidiary of CFP (France)).
- (c) The Bechtel consultant work was hired from Sonemes which was owned by SONATRACH 50%; Ente Minerario; and SNAM PROGETTI 50% (both from Italy).
- (d) The contract was signed with SEGAMO which jointly owned by Sonatrach 50%; Gaz de France 25%; ENGAS 25%.
- (e) The work was done by SAIPEM due to urgency.
(N.A.) Not available

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